SAMSUNG

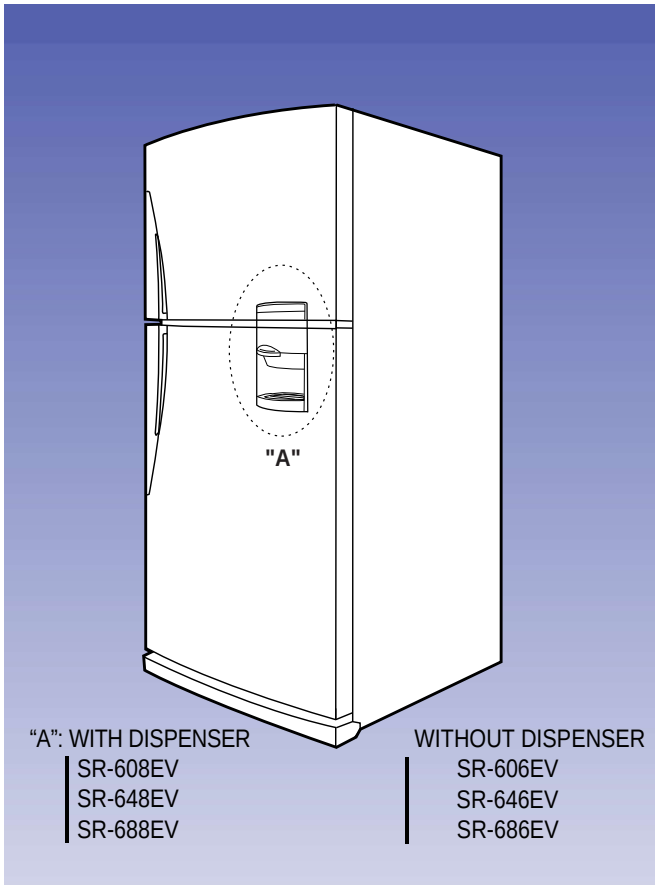
REFRIGERATOR

Model : SR-608EV
SR-648EV
SR-688EV

CFC FREE GREEN

SERVICE Manual

REFRIGERATOR



CONTENTS

1. Safety Precautions And Warnings
2. Product Specifications
3. Electrical Part Specifications & Standard
4. Electric Diagram
5. Outer Package Specification
6. Air Circulation Route
7. Functions And Directions
8. Circuit Operating Theory
9. Failure Diagnosis And Repairment
10. Disassemble & Assemble Drawing And Part Lists
11. Disassemble & Assemble Method
12. Packing Method
13. PCB Diagram
14. PCB Specifications
15. Main Components Specifacations

1. Safety precautions and warnings

Read all instructions before using this appliance in order to aboid risk of accident or possible damage.

Warning/Caution

Warning	This symbol is intended to alert the user to the possible death or injury.
Caution	This symbol is intended to alart the user to the possible injury or damage.

Description of symbols

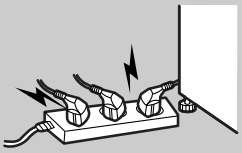
	Indicates prohibition
	Do not disassemble
	Do not contant
	Adhere the instruction strictly
	Unplug from the electrical outlet
	Earth the appliance to avoid the risk of an electric shock

Warning

Do not plug multiple electrical appliances into the same outlet.

- This may cause abnormal heating or a fire hazard.

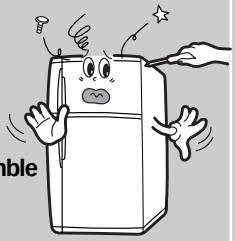
Prohibition



Do not attempt to make repairs yourself.

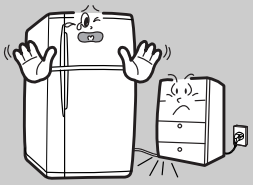
- This could lead to fire hazard or abnormal operation causing severe personal injury.

Do not disassemble



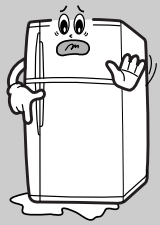
Make sure the power cord is not crushed or damaged.

- Repair immediately all power cords or outlets that have become frayed or otherwise damaged.



Check the operating environment.

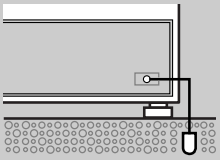
- Do not install the refrigerator in a humid (with condensation) location or on an unstable surface.



Do not attempt to make repairs yourself.

- This could lead to fire hazard or abnormal operation causing severe personal injury.

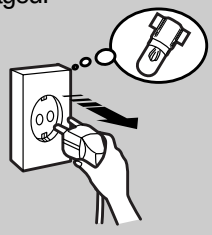
Earth



Make sure the power cord is not crushed or damaged.

- Repair immediately all power cords or outlets that have become frayed or otherwise damaged.

Unplug

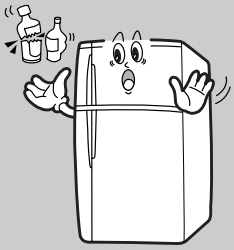


Caution

Do not store bottled food or drinks in the freezer compartment.

- Bottles may explode causing personal injury.

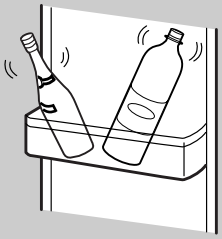
Prohibition



Do not store food in an unstable manner.

- Opening the door may trigger loose items to slip and cause injury.

Prohibition



Do not store anything other than food in the refrigerator.

- Medical supplies which need to be under strict temperature control should not be stored in the refrigerator.

Prohibition

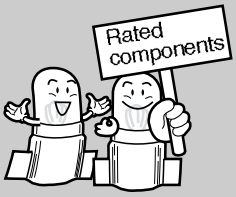
Do not put anything on top of the refrigerator.

- Opening or closing the door may trigger loose items to slip and cause injury.

Prohibition

When replacing electric components, be sure to use rated components.

- Check the model, rated voltage, rated current, operating temperature etc. of the component.



When servicing the refrigerator, completely remove dust or foreign substances from the housing, electric connections and etc.

- This can protect against the risk of fire hazard caused by tracking and short circuit.

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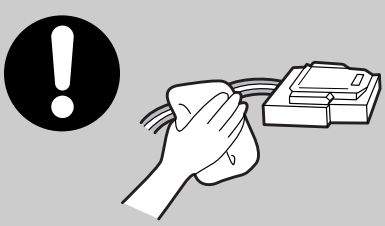
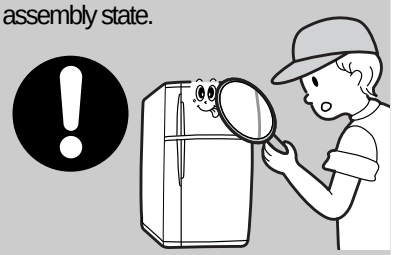


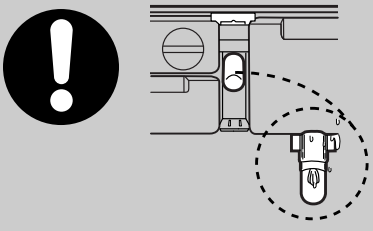
After servicing the refrigerator, be sure to check the components are reassembled in a correct manner.

- The serviced unit should be reassembled and returned to its original assembly state.

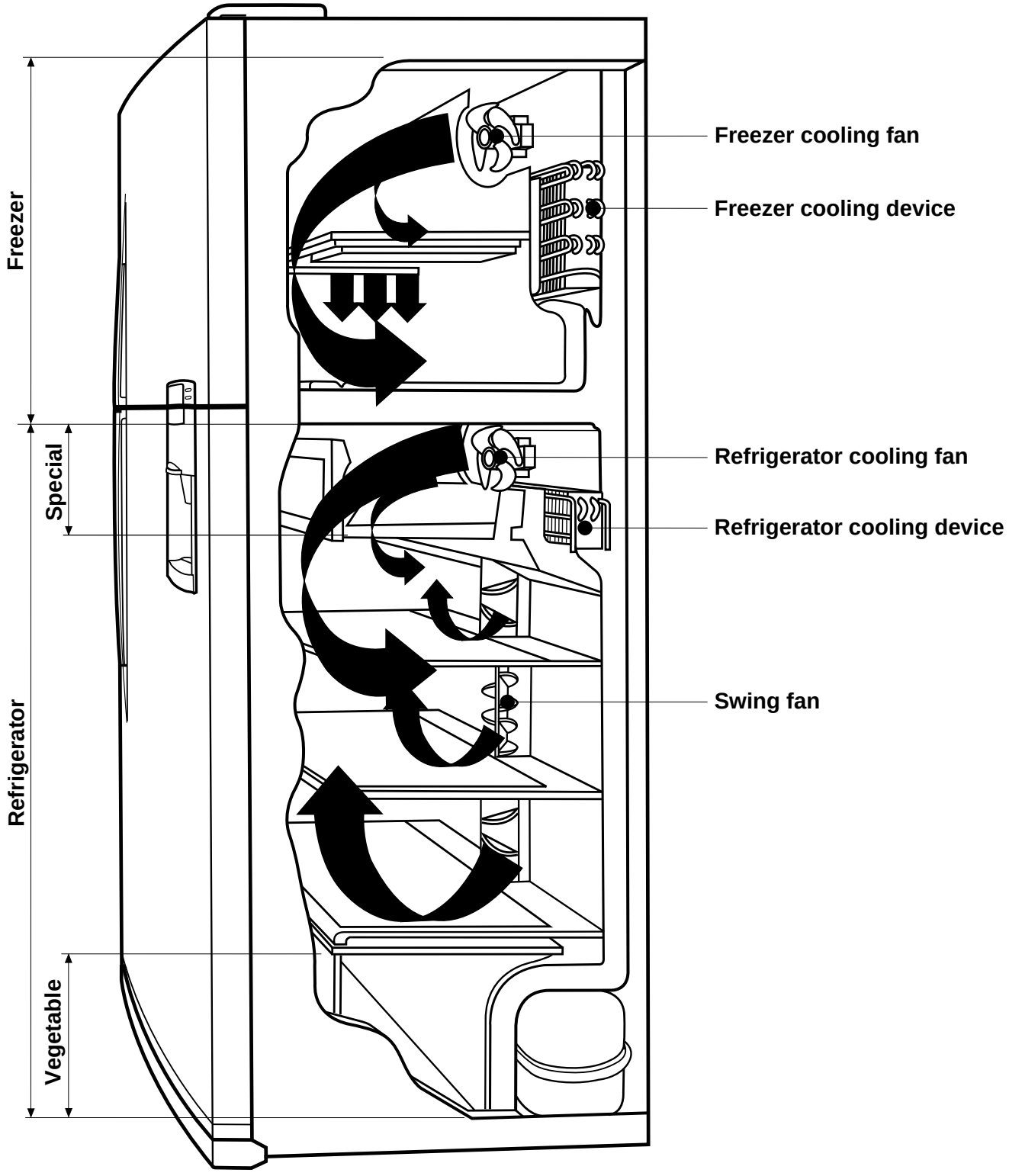


Check the electrical parts for the trace of moisture penetration.

- When the trace of moisture penetration is detected, replace the part or try insulation tapping.



6. Air circulation route



2. Product Specifications

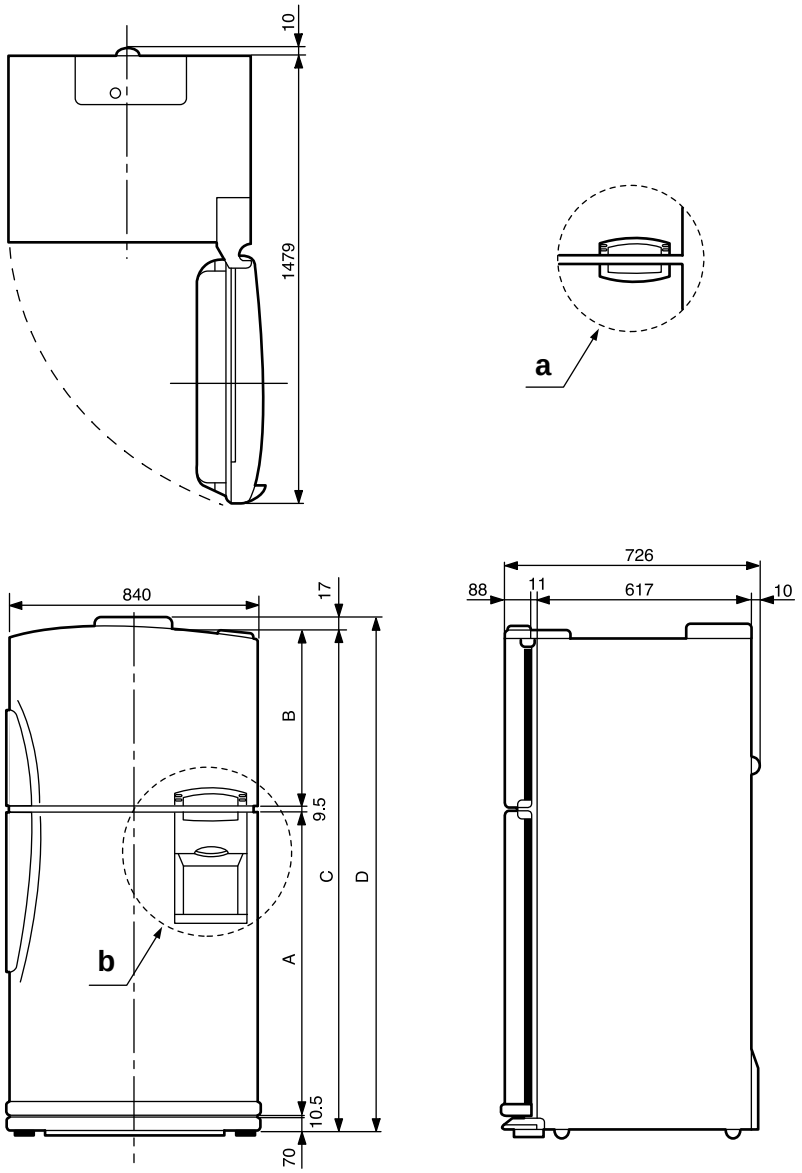
ITEM		STANDARD					
Model Name		SR-606EV	SR-608EV	SR-646EV	SR-648EV	SR-686EV	SR-688EV
Net Capacity (//CU.FT)	Total	504	499	544	538	581	575
	Freezer	153	153	165	165	165	165
	Refrigerator	351	346	379	373	416	410
Net dimension (WxHxD)		840x726x1753.5		840x726x1803.5		840x726x1847.5	
Regular Frequency		115/60, 127/60, 240/50. 220/50,60					
Electric Metor Regular Power		165W					
Electric Heating Equipment power		378W					
Sort of Refrigerator		Occassional cooling type refrigerator					
Cooling Mass		HFC-134a					
Cooling Mass Sealed Quanlty		155gr					
Freezer performance		**** (4 STAR)					
Net weight		105kg	106kg	106kg	107kg	108kg	109kg

3. Electrical part specifications & standard

ITEM			STANDARD				
Refrigeration Cycle	Compressor	Model	SK182C-L2W	SK182P-L2W	SK190H-L2U	SK190Q-L2U	
		Starting type	CSR	CSR	RSCR	RSCR	
		Oil charge	Freol α-15C(ESTER)/265CC				
	Evaporator	Freezer	Split Fin Type				
		Refrigerator	Split Fin Type				
	Condenser		Forced & Natural Convection Type				
	Dryer		Molecular Sieve XH-9				
	Capilary tube		0.82 X 2500 4.26kg/cm^2				
	Refrigerant		HFC-134a/155gr				
Temperature	Type		ON(˚C)		OFF(˚C)		
	Freezer	High	–20˚C		–22˚C		
		Mid	–17˚C		–19.0˚C		
		Low	–14˚C		–16˚C		

7. Function and Directions

7-1 The outer size

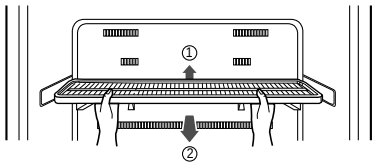


Model	A	B	C	D	Remark
SR-606EA	1066.5	580	1736.5	1753.5	‘a’ applied
SR-608EA	1066.5	580	1736.5	1753.5	‘b’ applied
SR-646EA	1096.5	600	1766.5	1803.5	‘a’ applied
SR-648EA	1096.5	600	1766.5	1803.5	‘b’ applied
SR-686EA	1140.5	600	1810.5	1847.5	‘a’ applied
SR-688EA	1140.5	600	1810.5	1847.5	‘b’ applied

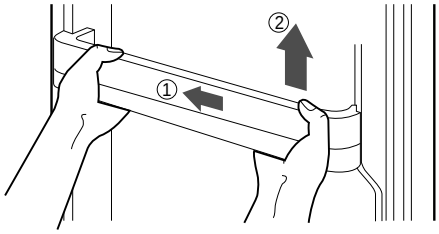
7-2 The name of each parts and disassemble method

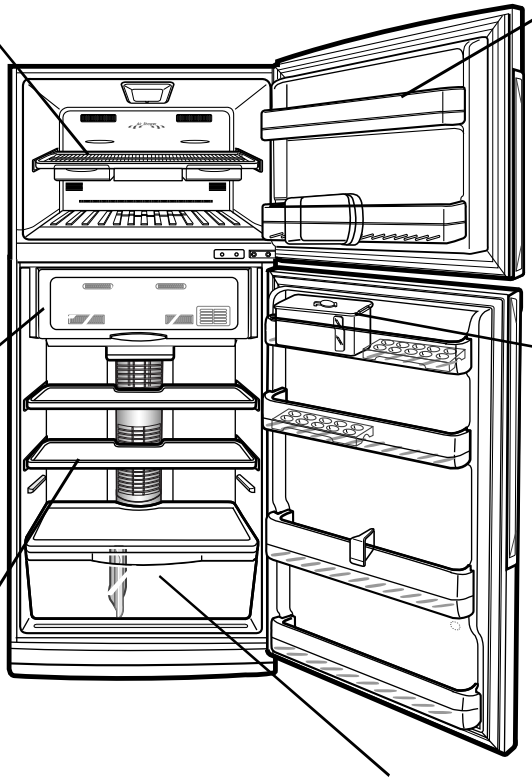
Freezer shelf

· Up the front of shelf to direction ① then pull and apart to direction ②.



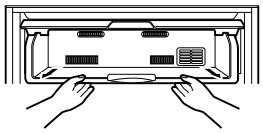
· Push to direction ① and apart to direction ②.



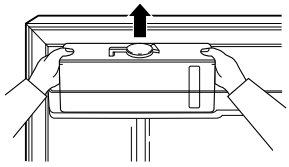


Chilled room shelf

· Pull to the arrow direction then up and apart at the locking point.

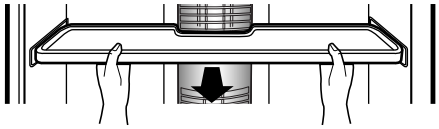


· Up and apart as showed.
(concerned model : SR-5066/5466/5866)



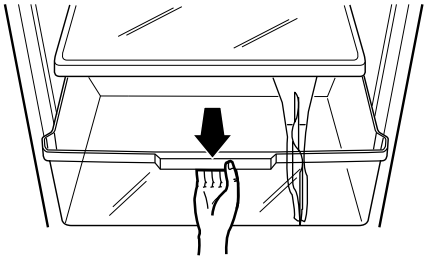
Shelf REF.

· Pull with both hands as showed.
· The height can be adjusted according to the stored bowls.



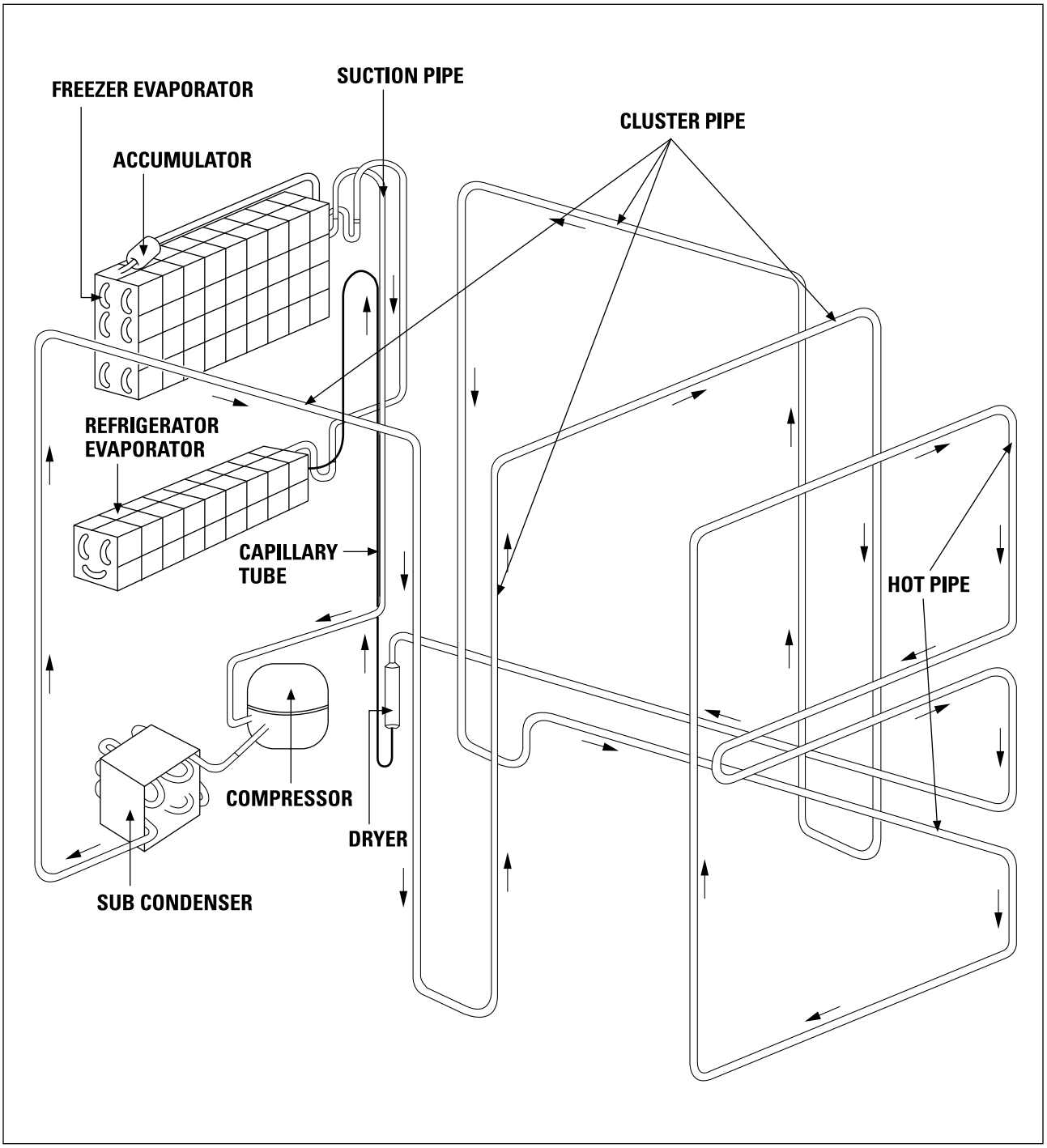
Vegetable box and cover

· Up the cover and apart then pull out the vegetable box at the mid-point and up and and pull to apart.

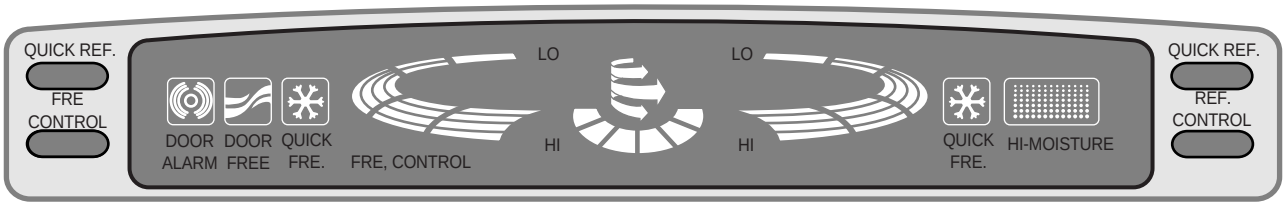


7-3 Freezing cycle

COMPRESSOR → SUB CONDENSER → CLUSTER PIPE → HOT PIPE → DRYER →CAPILLARY TUBE →REFRIGERATOR EVAPORATOR → FREEZER EVAPORATOR → ACCUMULATOR →SUCTION PIPE → COMPRESSOR



7-4 PANEL display



7-5 Temperature control

1) Freezer temperature control

1. It consists of five steps as follows and selected by one button.
   Mid → Mid.High → High → Low → Low.Mid
2. It is circulated and displayed one by one by pressing the button.
3. At first power on it is selected ”Mid”

Category	Initial power on	Pressed once	Pressed twice	Pressed 3 times	Pressed 4 times	Remark
Indicator Lamp	Mid	Mid·High	High	Low	Low·Mid	
Reference Temp.	–18˚C	–19.5˚C	–21˚C	–15˚C	–16.5˚C	

2) Temperature control in the refrigerating compartment

1) Select the 5 stages of ‘Mid’–‘Mid · High’–‘High’–‘Low’–‘Low · Mid’ with a button.
2) Whenever the temperature control button of refrigerator is pressed, it continues of light from ‘Mid’–‘Mid · High’–‘High’–‘Low’–‘Low · Mid’.
3) When power turns on “Mid” is automatically selected.

Category	Initial power on	Pressed once	Pressed twice	Pressed 3 times	Pressed 4 times	Remark
Indicator Lamp	Mid	Mid·High	High	Low	Low·Mid	
Reference Temp.	3˚C	1˚C	–1˚C	6˚C	4.5˚C	

7-6. Power freeze and Power

- Selected by additional quick freeze & refrigeration button.
- The lamp of quick freeze and refrigeration circulated everytime it pushed.
- No change of setting temperature occured during quick freeze and refrigeration selected.
- Temperature of freezer and refrigerator can be re-setted while quick freeze and refrigeration operates.

1) Quick freeze

(1)Comp. and F-fan runs continuously for two and a half hours when quick freeze selected. (one minute after selection)

(2) During quick freezing the refrigerator controlled by setted notch.

2) Quick refrigeration

(1) Comp. and R-fan runs until the temperature of refrigerator reaches -4˚C when quick refrigeration selected.

(2) After the temperature reaches -4˚C the 'HIGH' notch runs for an hour and finish quick refrigeration.

(3) Unless the temperature of refrigerator reaches -4˚C within two and a half hours quick refrigeration stopped.

3) When quick freeze and refrigeration selected at the same time

(1) Each function applied at the same time. Quick freeze runs Comp. and F-fan for two and a half hours and quick refrigeration runs Comp. and R-fan for two and a half hours with no relation of each other.

7-7 Alarming

1) Button touch ("Ding-Dong" sound)

(1)Everytime the button pushed, the input confirmation, "Ding-Dong", sounds.

(2) Not sounds, if two keys are pushed at the same time or wrongly handled.

2) Door-Open warning ("Ding-Dong" sound)

(1)Two minutes after door opened, ten times of alarming sounds.

(2) If door opened continuously, ten times of alarming sounds with one minute cycle.

(3)Alarming stopped just after door closed.

3) Forced operating and defrosting ("Beep" sound)

(1) If forced function selected the "beep" sounds.

(2) Alarming sounds untill the forced operating canceled by automatically (24Hr) or manualy.

(3) Alarming sounds untill the forced defrosting canceled by automatically (24Hr) or manualy.

7-8 Defrosting

1) From the first power on, defrosting started after 4 hours of total Comp on time.

2) After that defrosting cycle can be varied from 6 hours to 32hours. (Comp on time)

7-9 Testing

- Testing is for PCB, product, function and service.
- After testing, turn the power on to start self diagnosis.

1) Forced operating

(1) As the button on PCB pushed once, Comp starts immediately without 5 minutes delay.

(2)If forced operating selected the notch of freezer and refrigerator fixed to "HIGH" and "MID-HIGH". Then Comp and F-fan is controlled to pull-down and R-fan is controlled to "MID-HIGH" notch.

(3) Pull-down maintained just for 24 hours during forced operating, after that automatically defrost freezer and refrigerator and then starts normal operating.

(4) Turn the power off or select test cancel mode to cancel the forced operating.

(5)Alarming (0.25 sec on/0.75 sec off) continues until the forced operating finished. It continues without any relations to alarming key selection or cancel.

2) Forced defrosting

(1) Push the test button one more time to run the forced defrosting of refrigerator.

(2) One more push in the above status will run defrosting of freezer and refrigerator simultaneously.

(3) Forced operating cancelled automatically by starting foced defrosting and return to normal operating after completion of defrosting.

3) Test cancel mode

(1) One more push in the status of forced defrosting of F/R will run normal operating.

(2) Alarming stopped in the test cancel mode.

7-10 Self diagnosis

1) Self diagnosis at first power on

(1) As the power applied to the refrigerator first time, all displays show and run the self diagnosis.

(2) If no problems founded display returns to normal model.

(3) If problem is founded, on and off the related display lamp and start alarming.

(4) Lamp displayed until the problem solved or self diagnosis cancelled.

(5) After problem solved the display mode return to normal.

(6) When refrigerator repaired, sure to power off and on to run self diagnosis.

(7) Refer to belows for problems and related displays.

No	Item	Display LED	Symptom	Remark
1	R1-Sensor	Refrigerator "Low"	• R-room left sensor housing disconnection. • Faulty connection. • Wire open or short. • Faulty sensor.	R1-Sensor temperature is over +50˚C or below –50˚C.
2	R2-Sensor	Refrigerator "Low · Mid"	• R-room left right sensor housing disconnection. • Faulty connection. • Wire open or short. • Faulty sensor.	R2-Sensor temperature is over +50˚C or below –50˚C.
3	RD-Sensor	Refrigerator "Mid"	• R-room defrost sensor housing disconnection. • Faulty connection. • Wire open or short. • Faulty sensor.	RD-Sensor temperature is over +50˚C or below –50˚C.
4	Room-Temp. Sensor	Freezer "Low"	• Room-Temp sensor housing disconnection. • Faulty connection. • Wire open or short. • Faulty sensor.	Room-Temp Sensor temperature is over +50˚C or below –50˚C.
5	F-Sensor	Freezer "Low"	• F-room sensor housing disconnection. • Faulty connection • Wire open or short. • Faulty sensor.	F-Sensor temperature is over +50˚C or below –50˚C.
6	FD-Sensor	Freezer "Mid"	• R-room defrost sensor housing disconnection. • Faulty connection. • Wire open or short. • Faulty sensor.	F-Sensor temperature is over +50˚C or below –50˚C.
7	Geared-Motor	Refrigerator "High"	• Faulty geared-motor • Faulty reed-switch housing disconnection. • Faulty connection.	Square wave not detected by reed-S/W.

(Self-diagnosis Display Table)

7-11 Load status display

1) Press power F/R key for five seconds then press temperature control key in the refrigerator after temperature display lamps on and off three times.

2) This mode shows which load is being sourced signal from MICOM currently. This doesn' t mean the load is operating but just show MICOM signal output. The Compressor may not operate due to the open wire or relay missing though the display shows the Compressor operating.

3) Load status display return to normal mode after sixty seconds.

4) Follows are load status and related display.

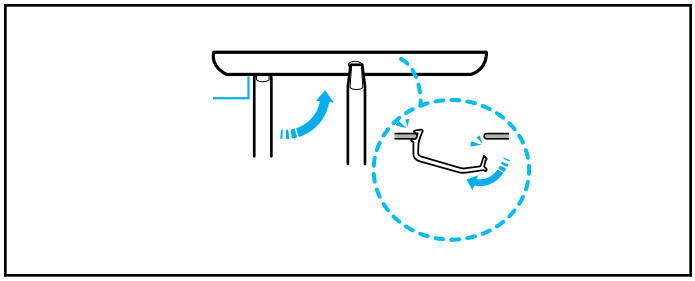
No	Item	Display LED	Display	Remark
	Freezer Subordinate			
1	COMP	Freezer "Low"	Relevant LED ON during Compressor operation	
2	F-FAN	Freezer "Low · Mid"	Relevant LED ON during F-FAN operation	
3	Freezer defrost Heater	Freezer "Mid"	Relevant LED ON during freezer defrost heater on	
4	Freezer bulb	Freezer "Mid · High"	Relevant LED ON during freezer bulb ON	
5	COMP. Cooling Fan	Freezer "High"	Relevant LED ON during Compressor Cooling Fan oeration	
	Refrigerator Subordinate			
6	R-FAN	Refrigerator "Low · Mid"	Relevant LED ON during F-FAN operation	
7	Refrigerator defrost Heater	Refrigerator "Mid"	Relevant LED ON during refrigerator defrost	
8	Refrigerator bulb	Refrigerator "Mid · High"	Relevant LED ON during refrigerator bulb ON	
9	GEARED-Motor	Refrigerator "High"	Relevant LED ON during refrigerator brade rotation	
	Mode Display			
10	Initial Mode	Quick Freezing	Relevant LED ON with initial power input	
11	Overload	Quick Refrigeration	Relevant LED ON when ROOM temperature is over 35˚C	
12	Low temp.	High humidity refrigeration	Relevant LED On when ROOM temperature is below 20˚C	

(Load Status Display Table)

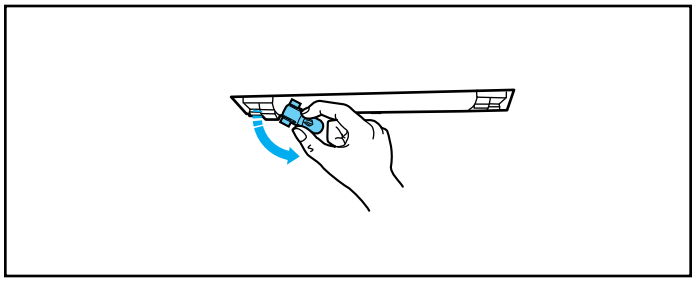
11. Disassemble and assemble method

11-1 Refrigerator inside lamp replacement

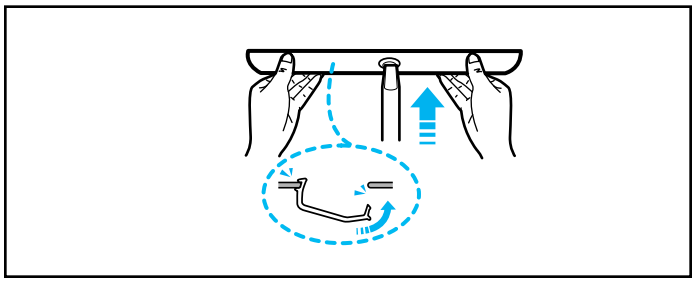
1) Remove the screw with (+) driver and push the cover to the arrow direction and apart.



2) Remove out the lamp to the arrow direction and replace with new one. (Left & Right)

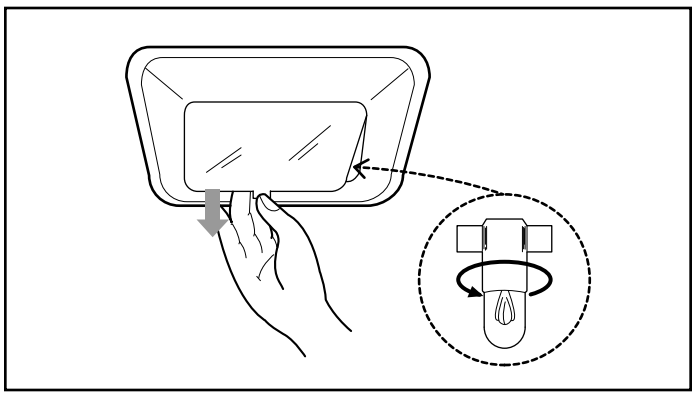


3) Insert the front of the cover first and screw it.



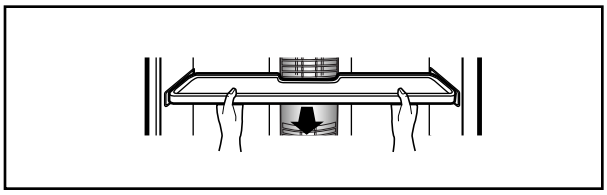
11-2 Freezer inside lamp replacement

- Grab the the salient part of cover and pull it down to apart. Replace the 220V / 15W lamp and insert front of cover first and then fix it.

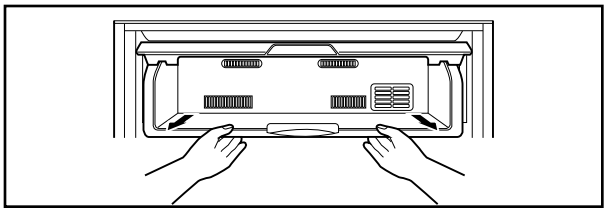


11-3 Disassemble of refrigerator cooling part

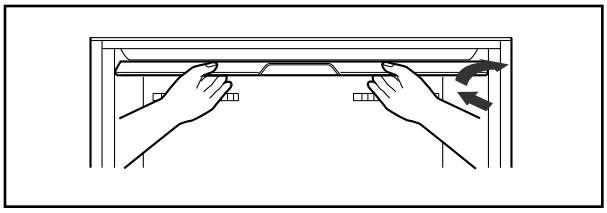
1) Remove foods and shelves inside the refrigerator.



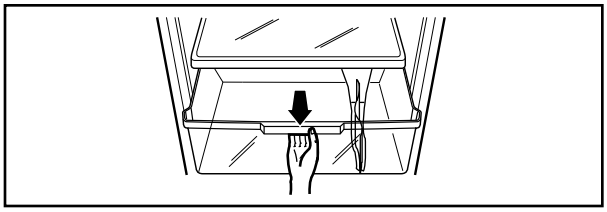
2) Pull out the chilled room box to the arrow direction and pul it up to apart at the locking point.



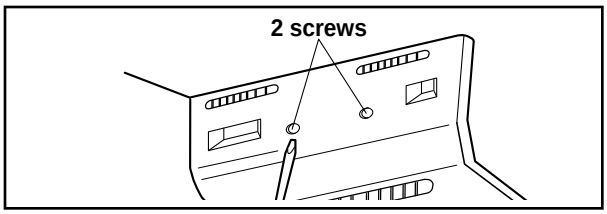
3) Push the right arrow part of the chilled room inside and apart the chilled room cover.



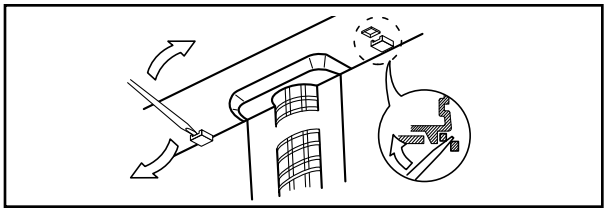
4) Up the cover of vegetable box and pull apart then pull it out.



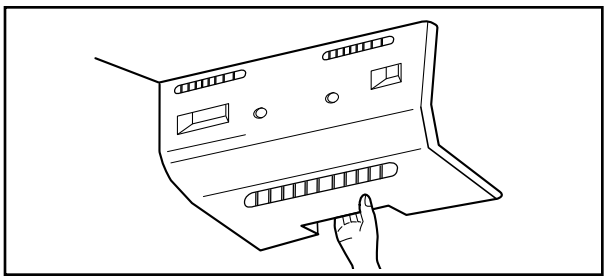
5) Remove the screws with (-) driver.



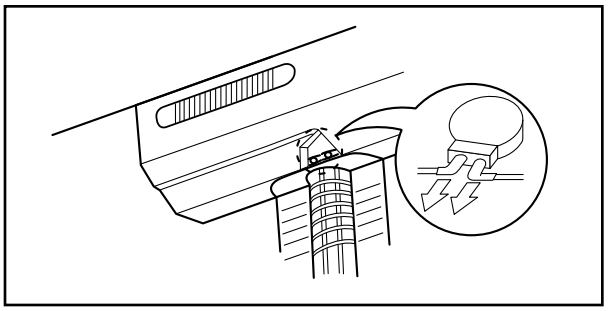
6) Release the locking part using (-) driver as shown.



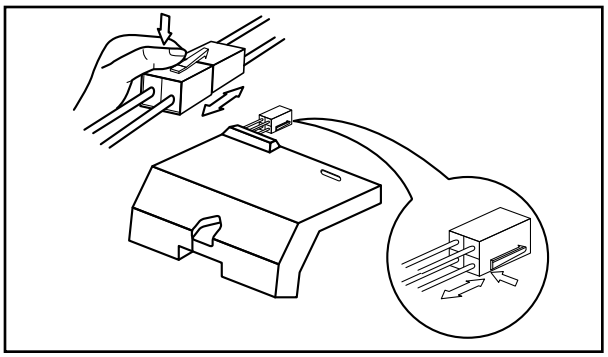
7) Pull out the cover front part.



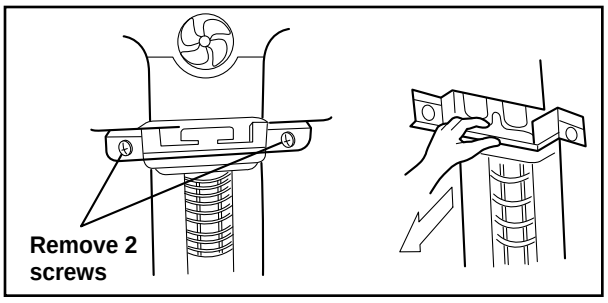
8) Disassemble the wire housing of motor in the center.



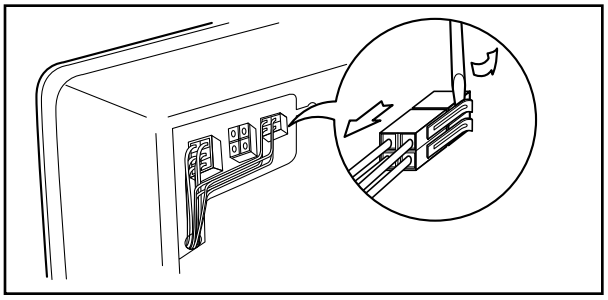
9) Pull the housing part and disassemble the wire terminal.



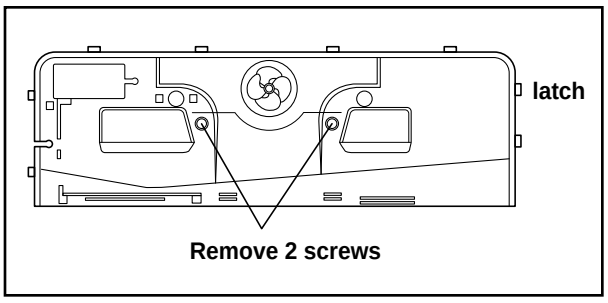
10) Remove screws of duct and pull apart.



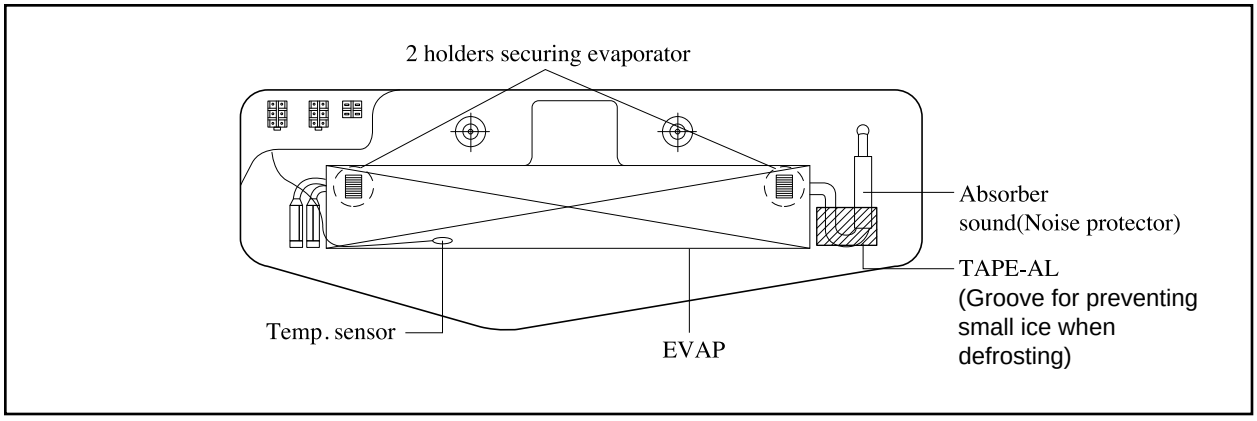
11) Release wire terminal on top of the left.



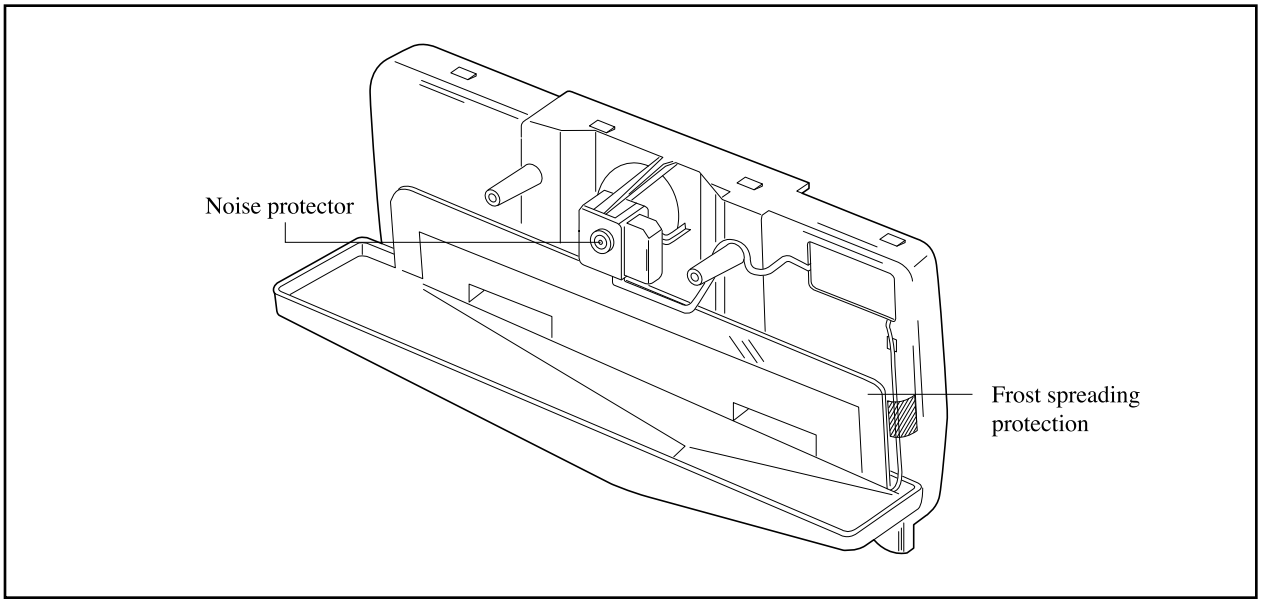
12) Remove screws of evap. Cover rear and release the locking part of both left and right using (-) driver.



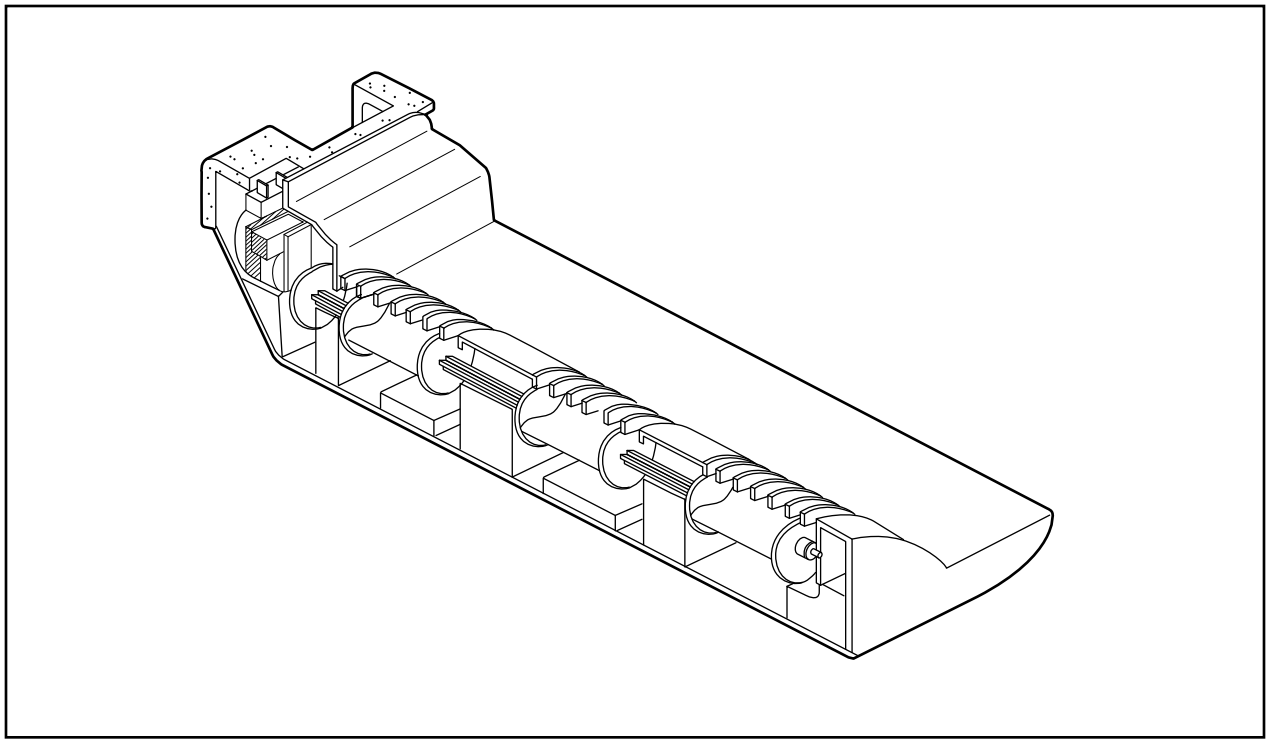
♦ Cooling cycle unit assembly in the refrigerating compartment



♦ Cooling cycle unit cover assembly in the refrigerating compartment

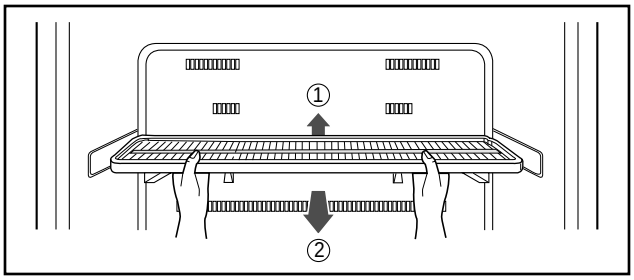


♦ Rotating duct assembly in the refrigerating compartment

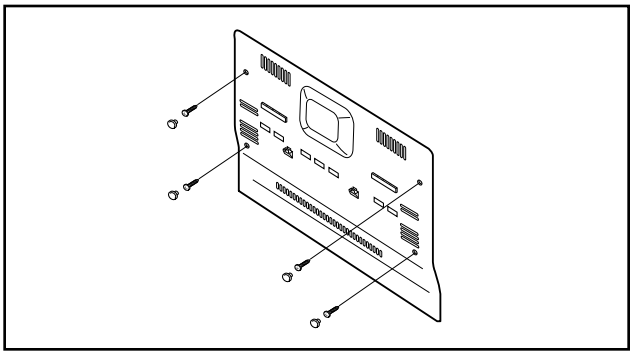


11-4 Disassemble of cooling part in the freezing room

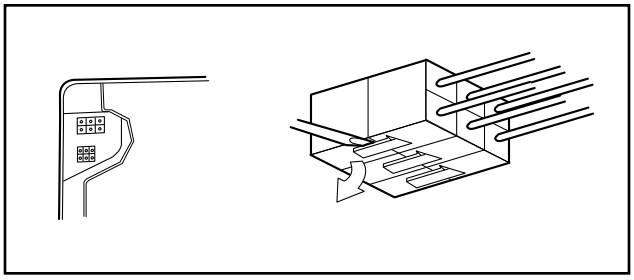
1) Pull out the shelf.



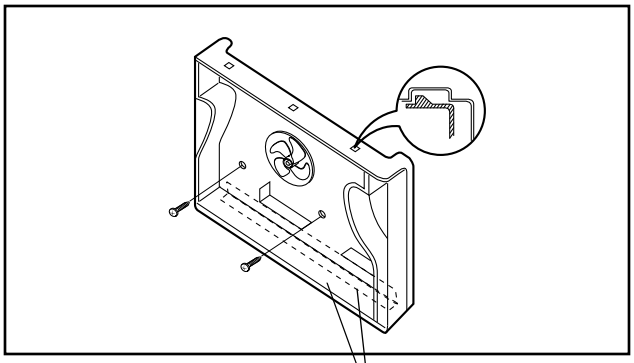
2) Remove screws of evap cover and pull apart.



3) Disconnect the each terminal of wire housing on top of the left side.

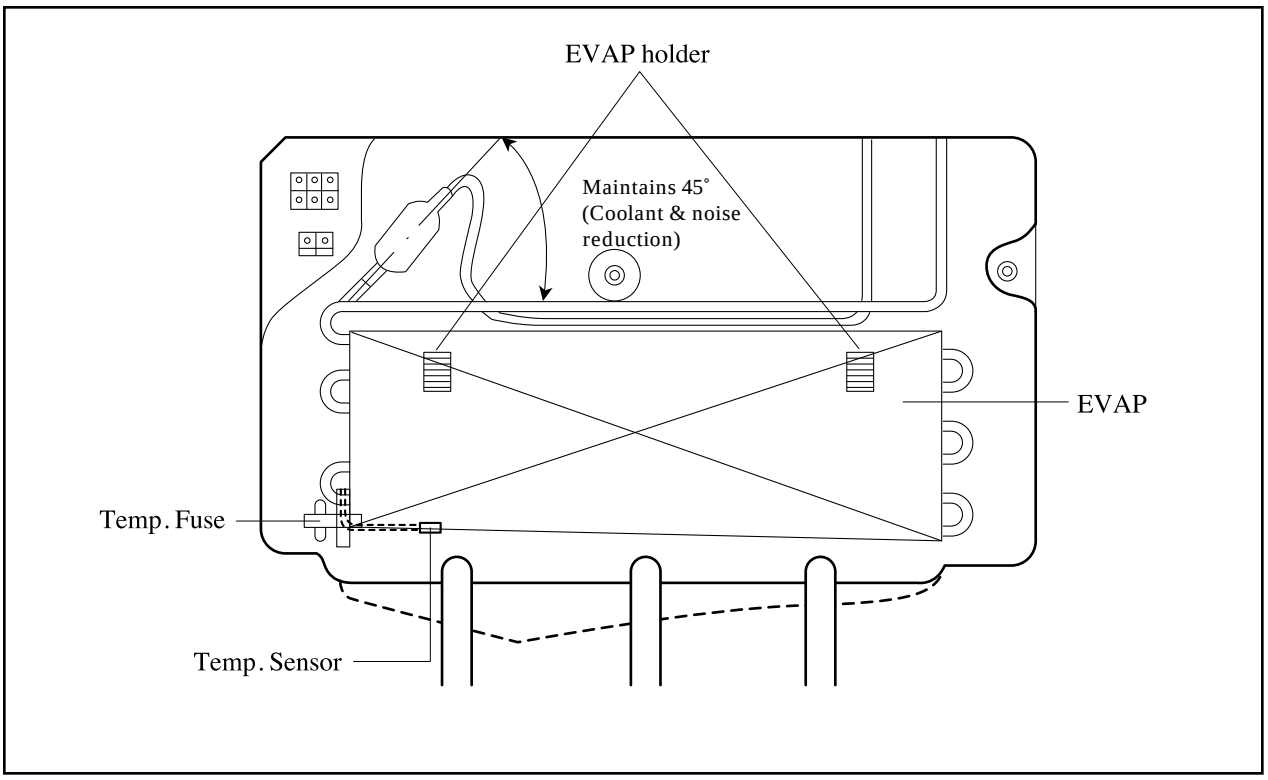


4) Remove screws of evap. Cover rear and release the locking point using (-) driver.



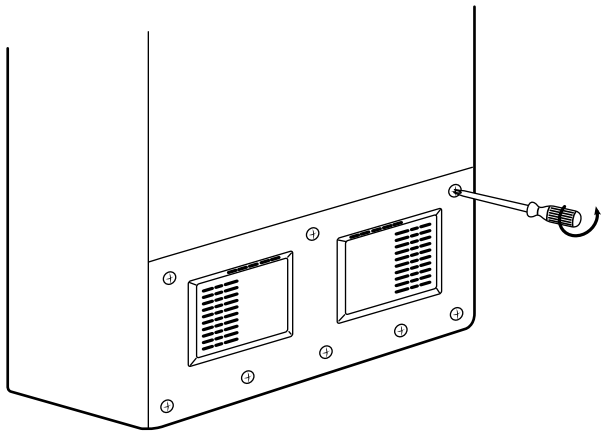
Residual spread preventer

♦ Assembly of the cooling cycle unit in the freezer

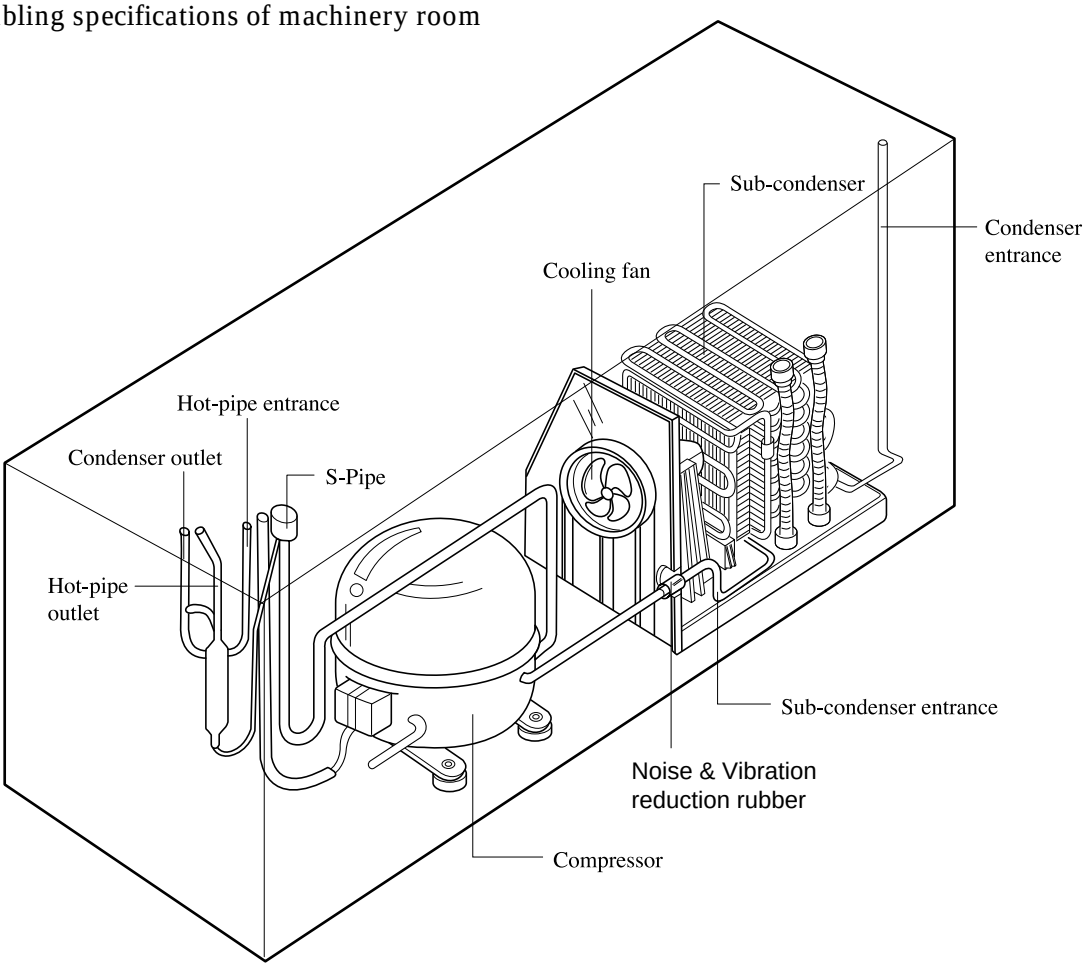


11-5 Assembling specifications of machinery room

1. remove screws of compressor cover

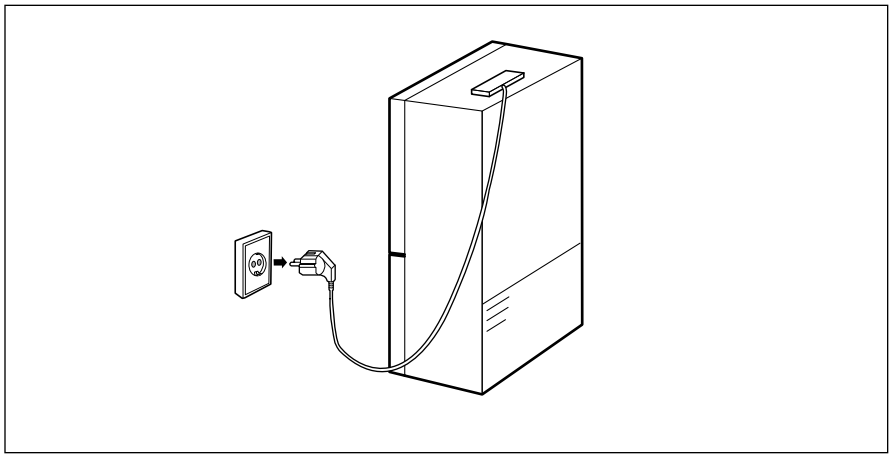


2. Assembling specifications of machinery room

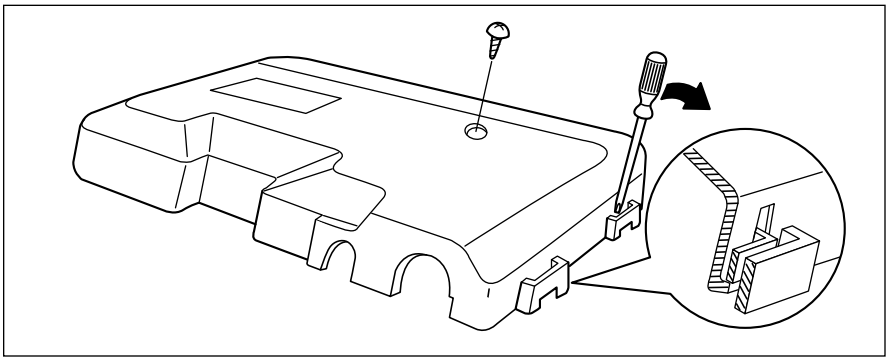


11-6 Assembling specifications of power supply part

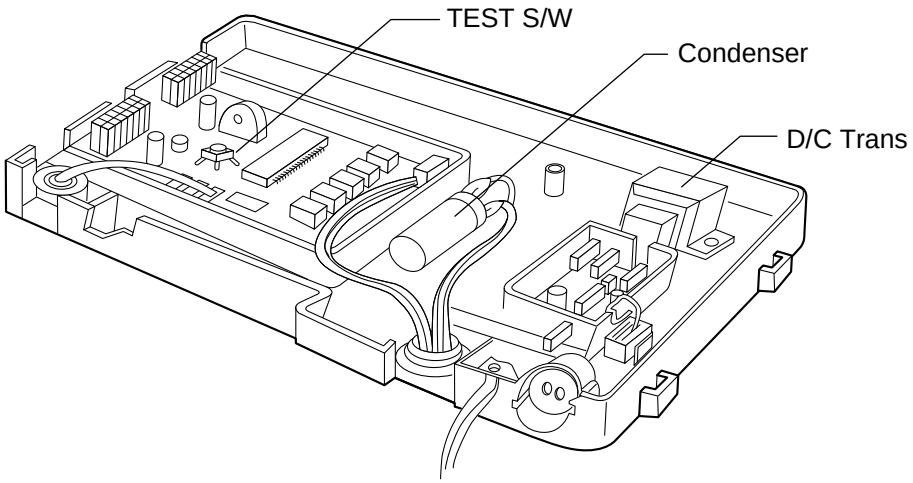
1. Turn off the power of refrigerator.



2. Remove the cover using (-) driver.



3. Assembling specifications of power supply part



11-7 Disassembling method and order of water dispenser

1. Disassembling method and order of cock part

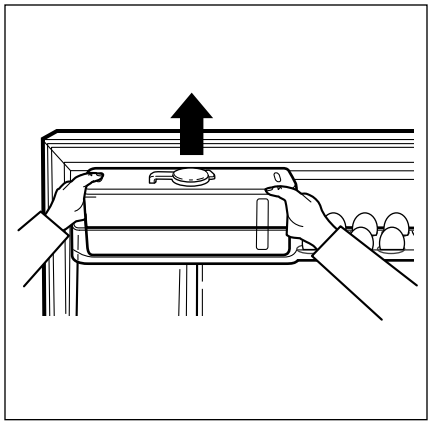
1-1. Open the door and detach the water tank. Throw away waters in the tank.

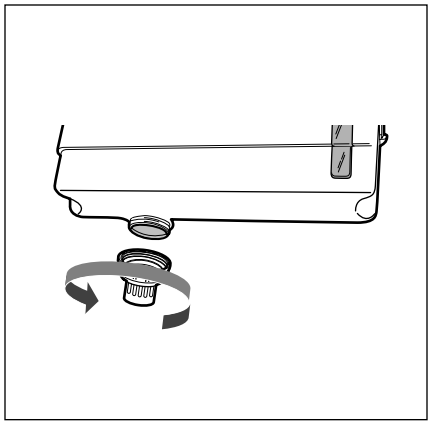
1-2. Turn the cock on the bottom of the water tank to counterclockwise and apart.

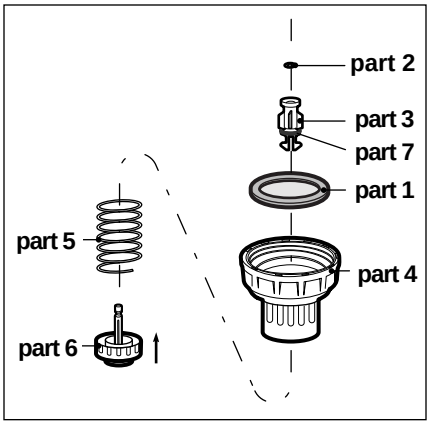
1-3. Push part 6 to arrow direction and apart part 2 then part 5,6 automatically aparted. Puch the locking point to arrow direcion to apart part 3.

1) Be careful not to damage the parts 1,2,5,7 (It may cause a leak of water.)

2) Assembling is reverse of the disassembling order.







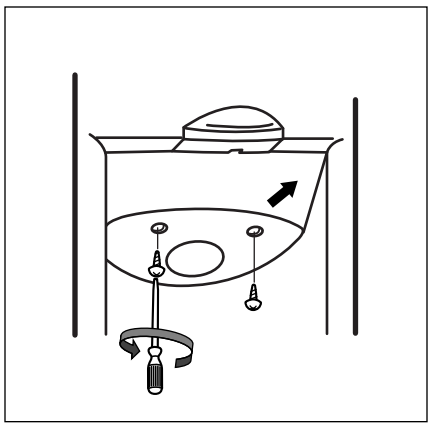
2. Disassembling method and order of lever

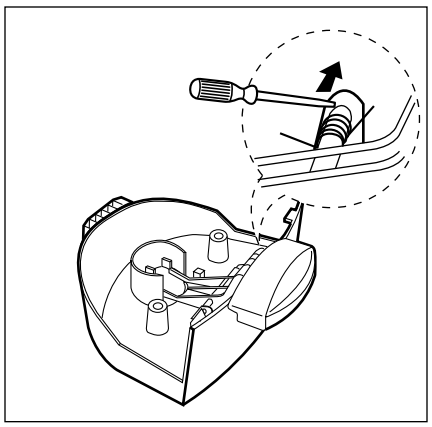
2-1. Close the door and turn the screw of the bottom of cover dispenser to counterclockwise using (+) driver and pull out to arrow direction and apart the cover.

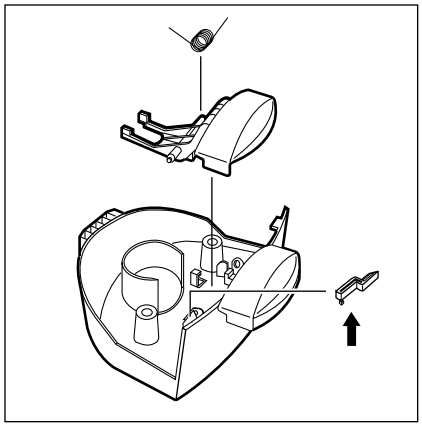
2-2. Release locking point of lever dispensor using (-) driver to the arrow direction and apart spring and lever dispenser.

2-3. Push locking point using (-) driver and pull out key-lock to upside then apart dispenser locking device.

2-4. Assembling is reverse of the disassembling order after inserting the spring to lever shaft.

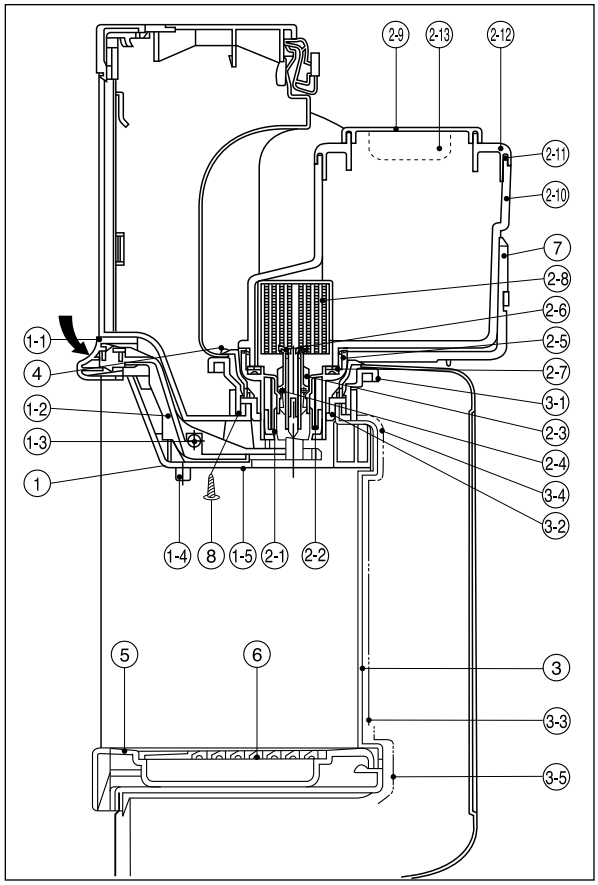




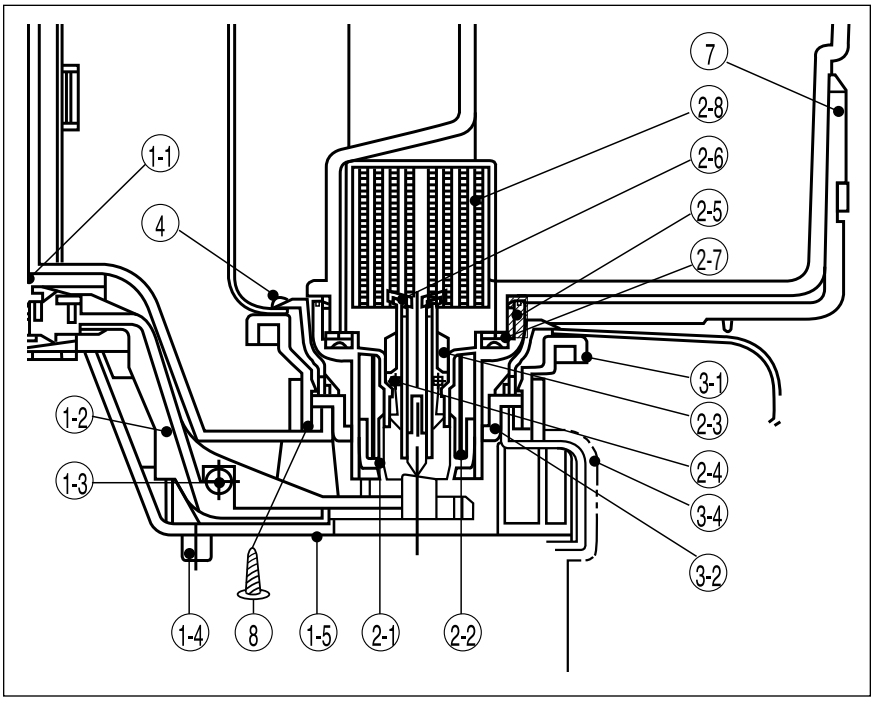


11-8 The operating theory and order of water dispenser

1. Push the knob lever(1-1) to the arrow direction.
2. Lever dispenser(1-2) rotates around spring-lever(1-3) to the counterclockwise and push guide pin(2-1) and press the spring dispenser(2-2) vertically.
3. O-ring(big)(2-4) inserted in guide-push(2-3) moves vertically and aparts from cock-dispenser(2-5) then water flows through path of guide-pin(2-1) to the cup.
4. O-ring(small)(2-6) inserted in guide-pin(2-1) also aparts from guide-push(2-3) to let air go through that helps water flowing.
5. Stop pushing knob lever(1-1) when water filled to certain point.
6. Lever-dispenser returns by expansive force of spring-dispenser(2-2) and spring-lever(1-3) .
7. Guide-push(2-2), guide-pin(2-1), o-ring(small)(2-6) and o-ring(big)(2-4) also retun and contact cock-dispenser(2-5) then return to initial state.



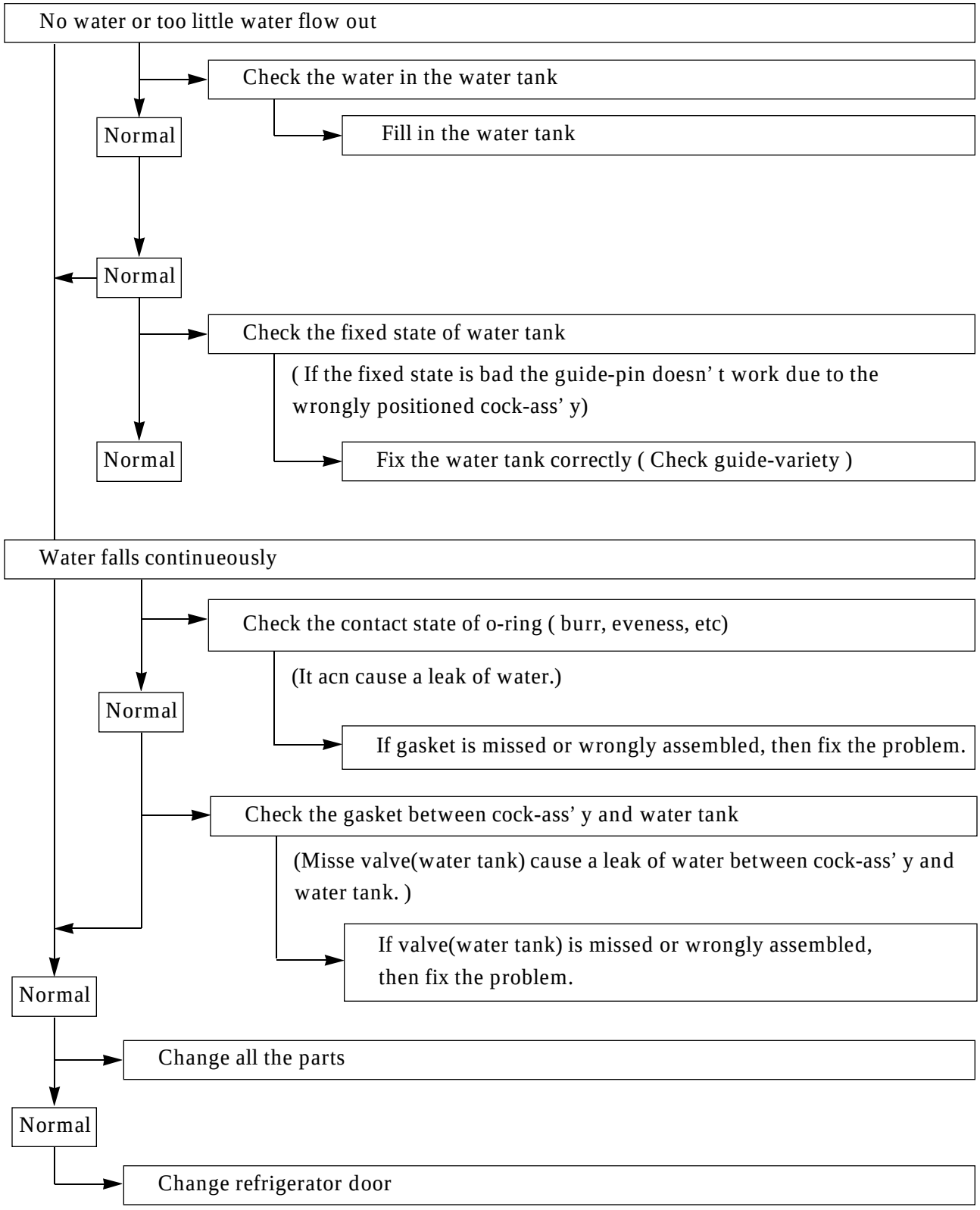
WATER-DISPENSER



11-9 Dispenser unit list

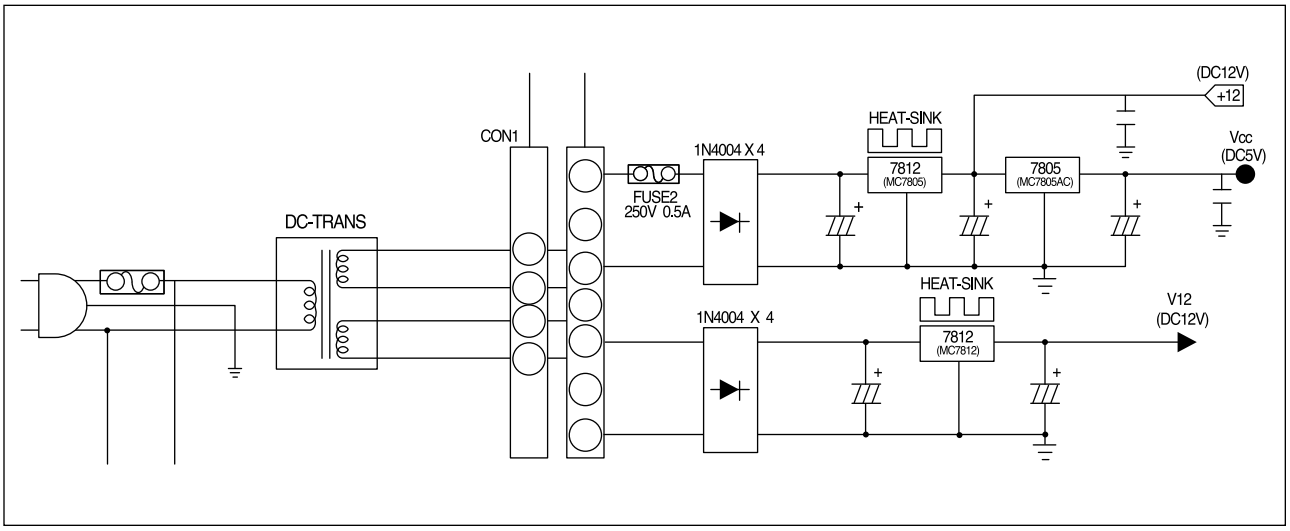
NO	CODE-NO	PART	SPEC.	Q'TY	REMARK
1	DA63-10905C	ASS'Y-COVER DISPENSER	M-PROJECT	1	
1-1	DA64-40173B	KNOB(LEVER)	ABS	1	
1-2	DA32-10105G	LEVER-DISPENSER	POM(TP-20)	1	
1-3	DA61-20146A	SPRING(LEVER)	STS-304(WPB)	1	
1-4	DA64-90138B	KEY(LEVER)	ABS(HG-0760)	1	
1-5	DA64-10896B	COVER-DISPENSER	ABS(HG-0760)	1	
2	DA64-90136A	TANK-WATER ASS'Y	M-PROJECT	1	
2-1	DA71-70158A	GUIDE-PIN	PC	1	
2-2	DA61-20147A	SPRING-DISPENSER	STS-304(WPB)	1	
2-3	DA71-70159A	GUIDE-PUSH	PC	1	
2-4	DA60-90103B	RING-O	SILICON(TSE-221)	1	
2-5	DA67-10402A	COCK-DISPENSER	PC-ABS	1	
2-6	DA60-90103A	RING-O	SILICON(TSE-221)	1	
2-7	DA74-40142A	VALVE(WATER-TANK)	SILICON(TSE-221)	1	
2-8	DA71-20159A	FIXER-FILTER	PE(HARD)	1	
2-9	DA67-30214A	CAP-TANK UPP	PE(SEMI-HARD)	1	
2-10	DA74-90115B	TANK-WATER	ABS(INSERT)	1	
2-11	DA63-30011A	GASKET-COMP V/PLATE	SILICON(TSE-221)	1	
2-12	DA63-10383A	COVER TANK	ABS, WHT	1	
2-13	DA65-20004A	CLAMP-TANK	PC ABS	2	
2-14	DA67-30005A	CAP	ABS	1	PART USED INSTEAD OF WATER TANK
3	DA67-10403B	CASE-DISPENSER	ABS	1	A/S IMPOSSIBLE
3-1	DA71-20264A	FIXER-CASE	ABS	1	A/S IMPOSSIBLE
3-2	DA74-40144A	VALVE(FIXER-CASE)	SILICON(TSE-221)	1	A/S IMPOSSIBLE
3-3	DA02-10143A	TAPE-AL, FOIL(B)	AL(T=0.075)	1	A/S IMPOSSIBLE
3-4	DA02-10142A	TAPE-AL, FOIL(A)	AL(T=0.075)	1	A/S IMPOSSIBLE
3-5	DA02-10014A	TAPE-AL	TAPE AL, T0.05, W50, 1RL	0.32MT	A/S IMPOSSIBLE
4	DA63-10010A	COVER-DISPENSER, B	ABS	1	
5	DA67-40295B	TRAY-DISPENSER, A	ABS	1	
6	DA67-40294B	TRAY-DISPENSER, B	ABS	1	
7	DA63-20158C	GUARD-VARIETY, A	GPPS	1	
8	6002-000213	SCREW-TAP	TH1 4X12 FZ-FZY	2	

11-10 General diagnosis of water dispenser


No water or too little water flow out
Check the water in the water tank
Normal
Fill in the water tank
Normal
Check the fixed state of water tank
(If the fixed state is bad the guide-pin doesn' t work due to the wrongly positioned cock-ass' y)
Normal
Fix the water tank correctly (Check guide-variety)
Water falls continueously
Check the contact state of o-ring (burr, eveness, etc)
(It acn cause a leak of water.)
Normal
If gasket is missed or wrongly assembled, then fix the problem.
Check the gasket between cock-ass' y and water tank
(Misse valve(water tank) cause a leak of water between cock-ass' y and water tank.)
If valve(water tank) is missed or wrongly assembled, then fix the problem.
Normal
Change all the parts
Normal
Change refrigerator door

8. Circuit operating theory

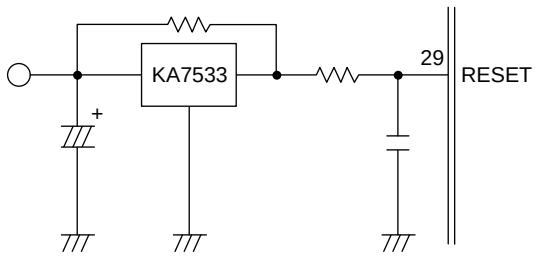
8-1 Power supply part



Voltage	Circuit used
+12 (DC 12V)	Relay Operation
Vcc (DC 5V)	Power around MICOM & Sensor Detector
V12 (DC 12V)	LED Display & S/W Detector

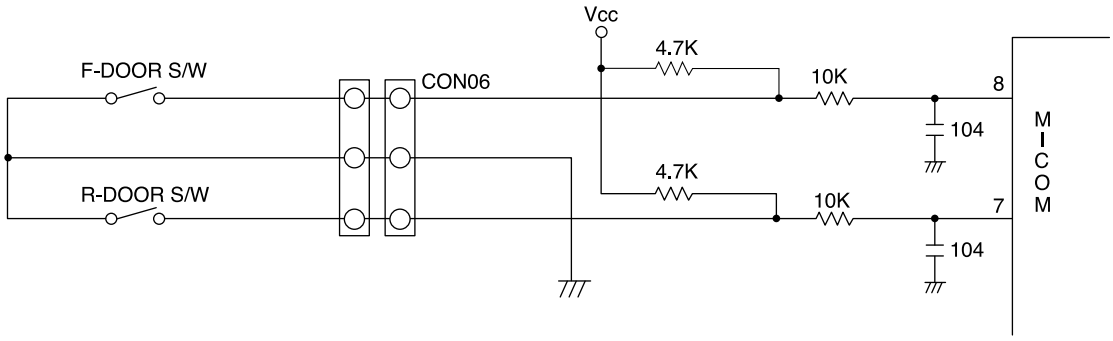
Secondary voltage output of DC trans is sourced 1~3 and 5~7 about 15V. On the 'a' part, input is rectified and regulated by MC 7812 and is about DC12V. This voltage is applied for relay running and regulated again by 7805 to transformer. DC 5V is applied to display part after rectified and regulated by MC7812.

8-2 Resetpart



Reset part is intialize RAM of MICOM and others when power is on or power is interrupted for some time. It will make whole program runs from the first status. When power is supplied, reset voltage is "low" status for a few seconds and turn into "High" status in the normal operating.

8-3 Door S/W sensing part

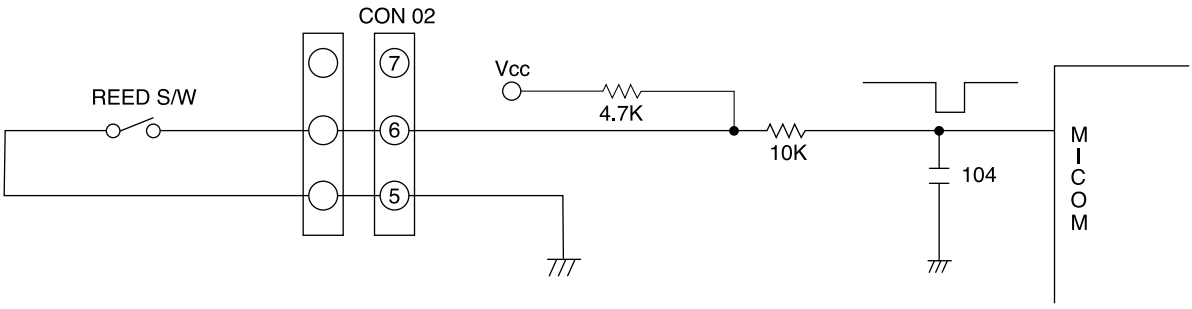


DOOR	Door Conditions	Door S/W Contact	CON06 PIN NO	Micom Input Voltage
F	CLOSE	CLOSE	1	"HIGH"
	OPEN	OPEN		"LOW"
R	CLOSE	CLOSE	3	"HIGH"
	OPEN	OPEN		"LOW"

1) When the door is opened, the door S/W closed and MICOM input is 'Low'.
   Then the door-open is sensed.

2) When the door is closed, the door S/W is opened and MICOM input is 'high'.
   Then the door closed is sensed.

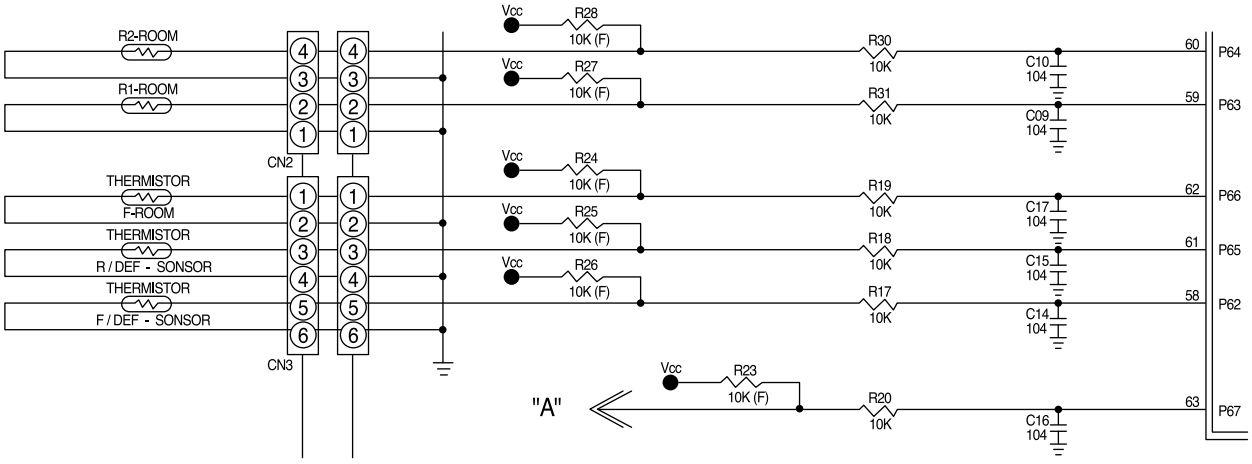
8-4 "V" motor, location sensing part (Reed S/W)



1) "V" motor's location sensing which is for G.A. fuzzy control is done by reed S/W.

2) There occure a "high" to "Low" and "Low" to "High" conversion period on con02 pin6 by the motion of swing fan. "V" motor's location is detected by it

8-5. Temp. sensing part



(Room Temp Sensor)

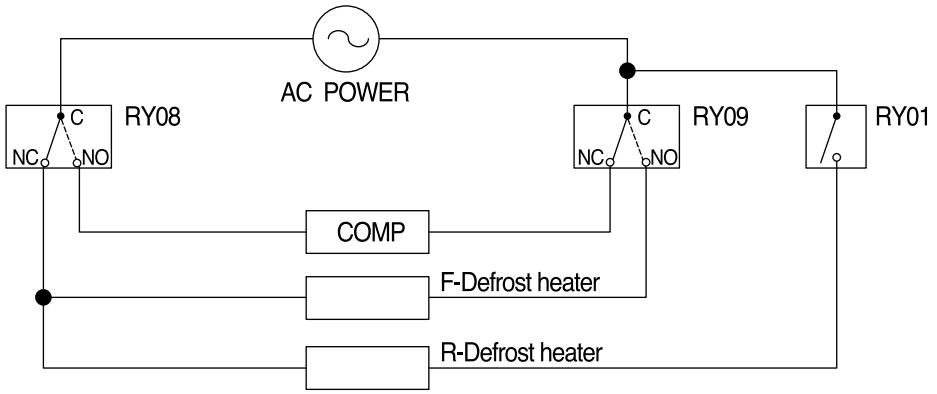
When Sensor is opened	When sensor is cut off
MICOM input “HIGH”	MICOM input “LOW”

1) Thermistor is used for sensing which has negative resistance coffiecient to the temperature.

2) MICOM input voltage, VF of sensor is $V_{F=} \frac{R_{TH}}{R_{TH} + R_{24}} \times Vcc$ (Vcc: 5V, Rth : Sensor resistance)

3) Refer to conversion table for VF and RTH according to temperature.

8-6 Comp and defrosting heater operating



As it is seen above block diagram, 220V line is connected to the commons of Comp relay, Ry78 and defrosting heater relay, Ry77, Ry71. When those relays are off state Comp and defrosting heater are also off. As Comp relay moves to on and AC 220V applied to Comp load it starts operating. On the other hand defrost heater runs if defrost heater relay moves to on. There is no chance that both Comp and defrost heater runs together so it's useful for safety aspect.

RELAY		Load	Remark
COMP	Defrost H		
ON	OFF	Comp Operation	Defrost-Heater Power Off
ON	OFF	Comp off, Defrost-Heater Off	
ON	OFF	Defrost-Heater On	Comp Power Off
ON	OFF	Comp Off, Defrost-Heater Off	

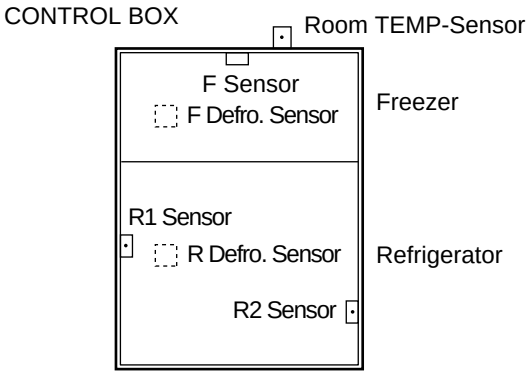
9. Failure diagnosis and repairment

Main PCB check

- Turn the power off and on again for self diagnosis check.
- Refer to belows for error code table

♦ Error code table

Item	Display "LOW"	"LOW.Mid"	"Mid"	"Mid.HIGH"	"LOW"
Refrigerator	R1 sensor	R2 sensor	R Defro. sensor	–	Swing fan motor
Freezer	Room Temp sensor	F sensor	F Defro. sensor	–	–



♦ **Table for Vf and Rth according to temperature**

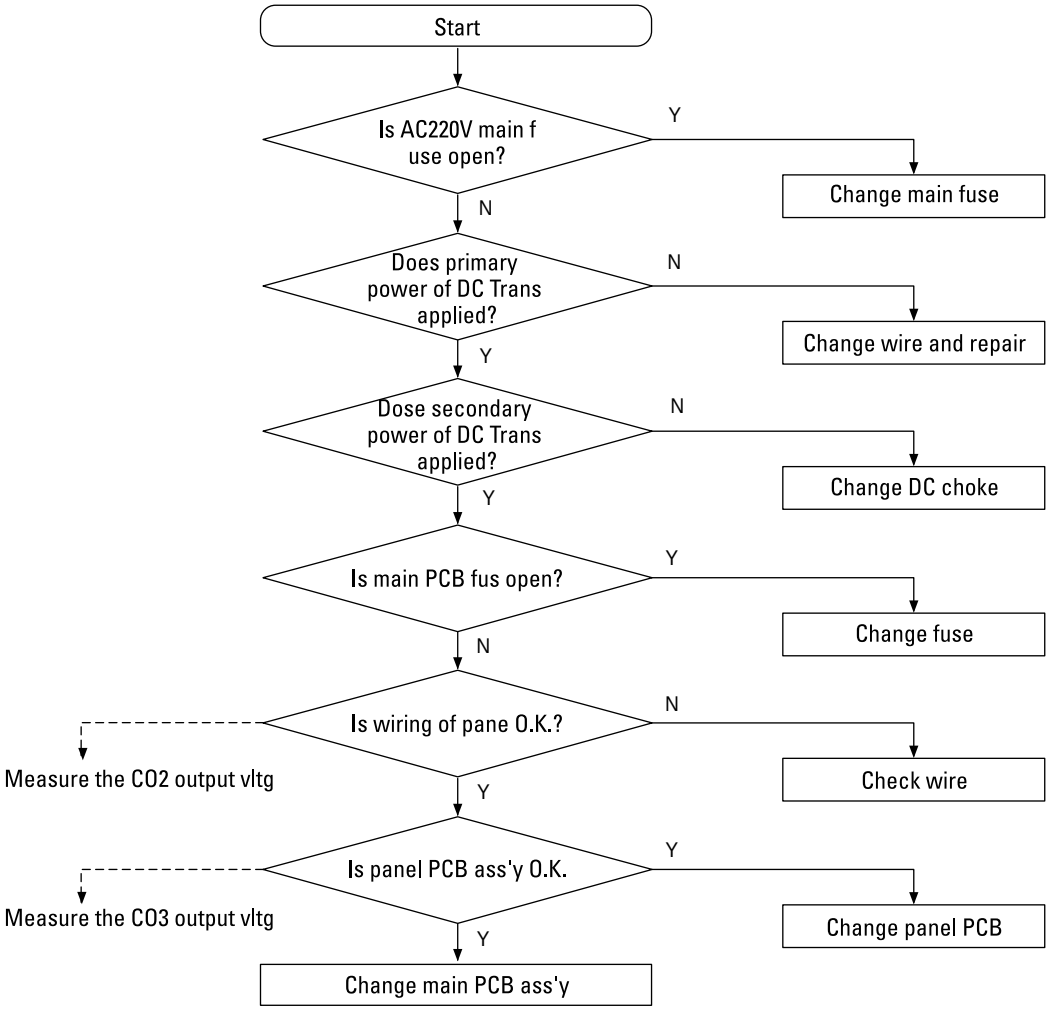
T(˚C)	R(ohm)	V(v)	T(˚C)	R(ohm)	V(v)
-35	68648	4.364	-18	28838	3.712
-34	65011	4.333	-17	27502	3.666
-33	61595	4.301	-16	26237	3.620
-32	58384	4.268	-15	25040	3.573
-31	55366	4.235	-14	23906	3.525
-30	52526	4.200	-13	22832	3.477
-29	49854	4.164	-12	21814	3.428
-28	47337	4.127	-11	20848	3.379
-27	44967	4.090	-10	19932	3.329
-26	42733	4.051	-9	19062	3.279
-25	40626	4.012	-8	18237	3.229
-24	38640	3.972	-7	17453	3.178
-23	36765	3.930	-6	16709	3.127
-22	34995	3.888	-5	16001	3.076
-21	33323	3.845	-4	15328	3.025
-20	31743	3.802	-3	14688	2.974
-19	30250	3.757	-2	14080	2.923

T(˚C)	R(ohm)	V(v)	T(˚C)	R(ohm)	V(v)
-1	14051	2.872	16	6910	2.043
0	12949	2.821	17	6659	1.998
1	12424	2.770	18	6420	1.954
2	11924	2.719	19	6190	1.911
3	11447	2.668	20	5970	1.869
4	10993	2.618	21	5759	1.828
5	10559	2.567	22	5557	1.786
6	10146	2.518	23	5363	1.745
7	9752	2.468	24	5178	1.705
8	9375	2.419	25	5000	1.666
9	9016	2.370	26	4829	1.628
10	8673	2.322	27	4665	1.590
11	8345	2.274	28	4508	1.553
12	8032	2.227	29	4357	1.517
13	7732	2.180	30	4212	1.481
14	7446	2.134			
15	7172	2.088			

Check in advance

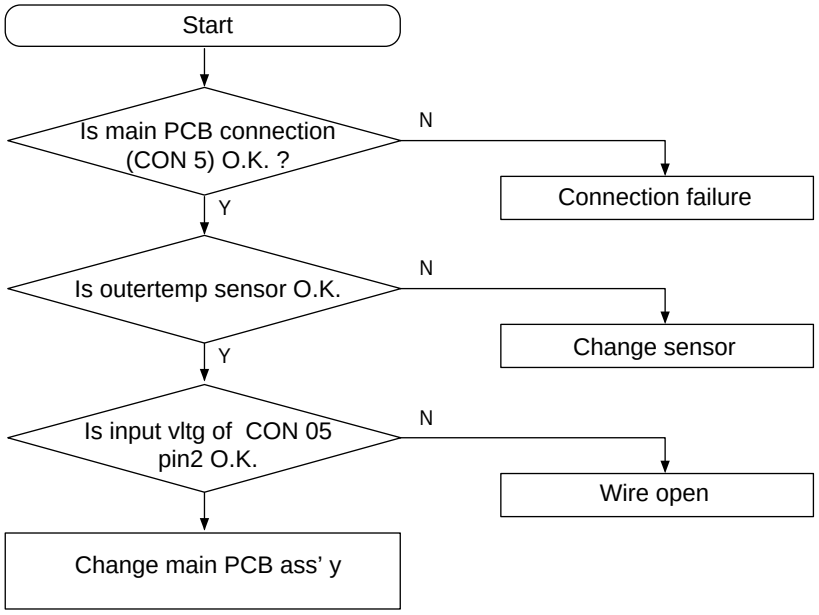
1. Check the power of consent and power code.
2. Check it based on the "References" on the next pages.

9-1 No Input Power

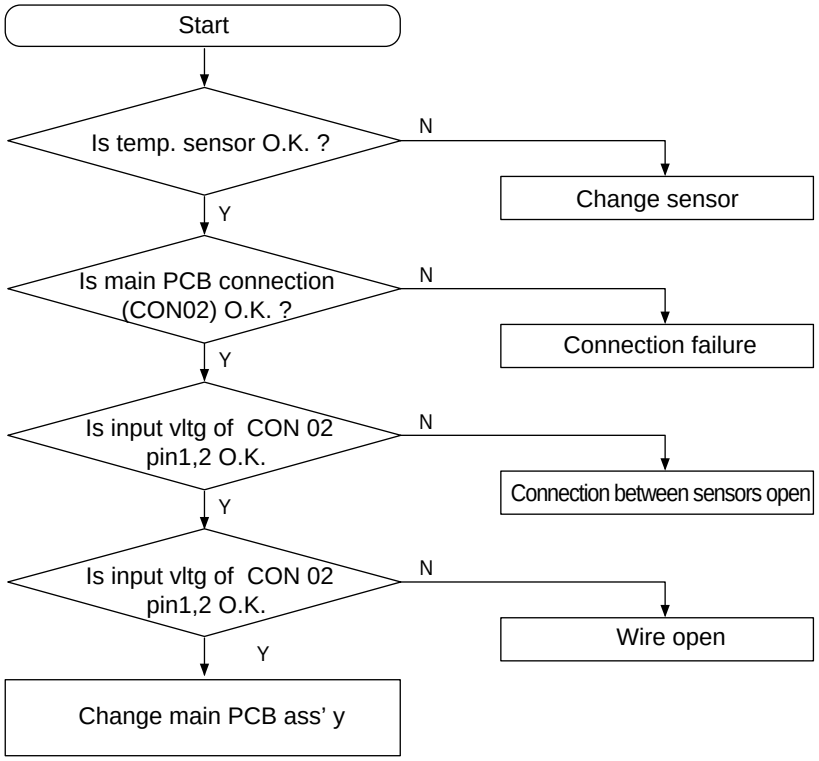


9-2 Self diagnosis failure

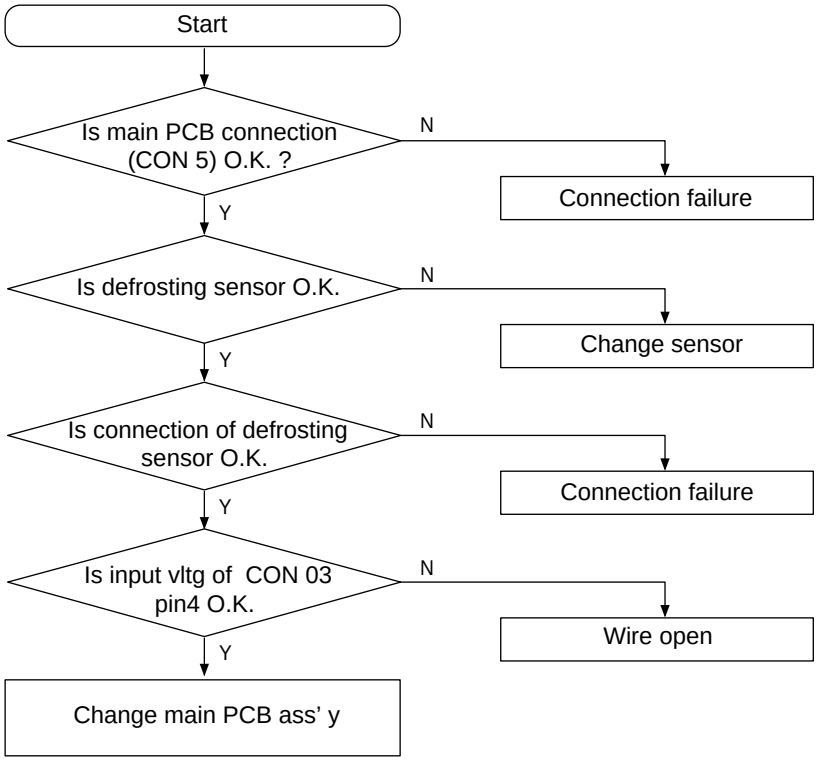
1) Outer temperature sensor failure



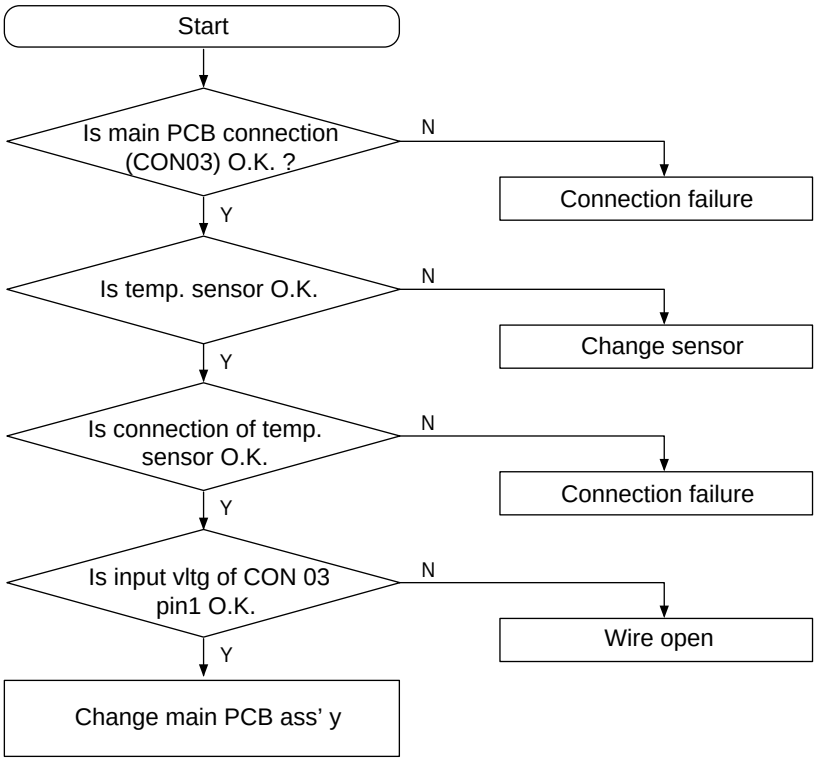
2) R1, R2, refrigerator temp. sensor failure



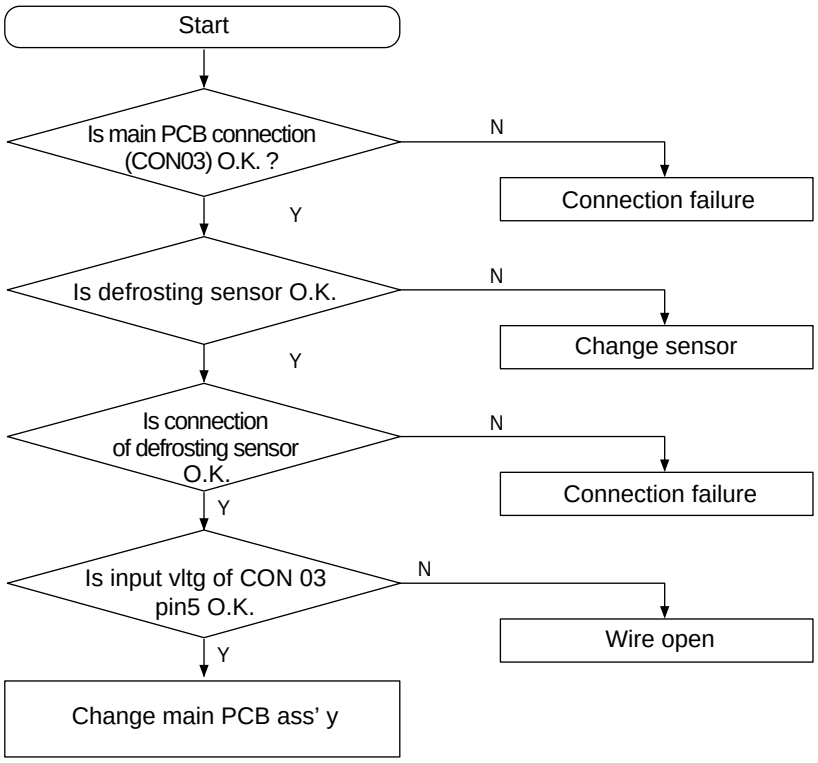
3) Refrigerator' s defrosting sensor failure



4) F1, Freezer temp. sensor failure



5) Freezer' s defrosting sensor failure

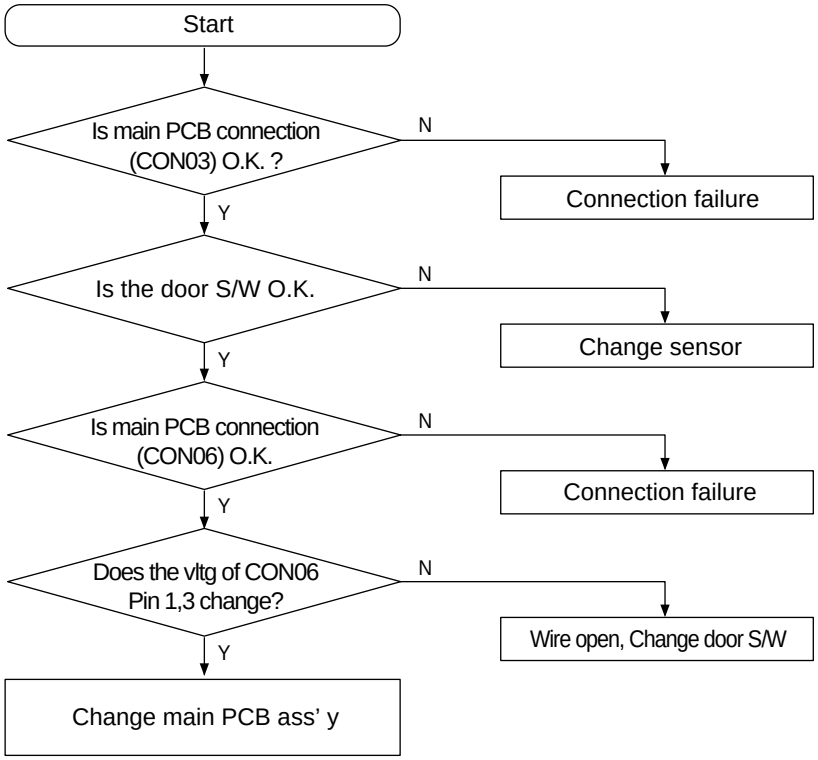


9-3 In case of continuous alarming

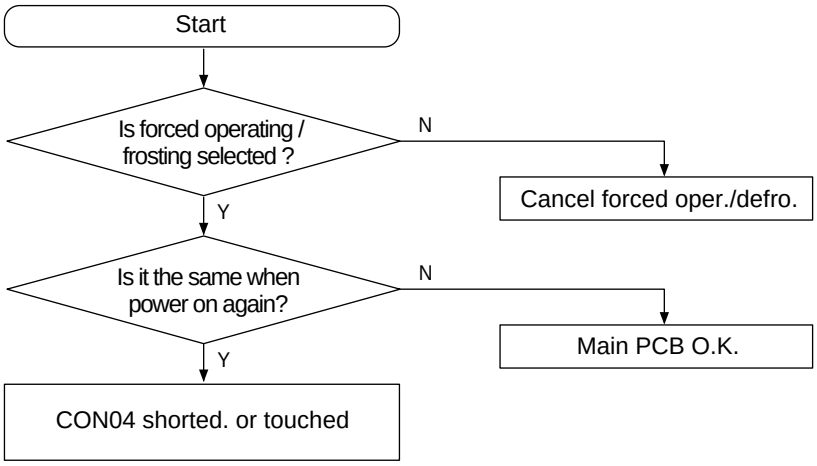
references

- F/R door open alarms for ten seconds after 2 minutes later. If door opens continuously, door open alarms for ten seconds with one minute cycle. (ten times of "Ding-Dong")
- If there is moisture in door S/W, it is shorted and alarms due to the MICOM's misjudgement. In this case the inside lamps of freezer and refrigerator turns off so the lamp do not turns on though you open the door.
- If the door S/W is rusted, the signal of door open do not reach to MICOM and no alarms and lamps turned off continuously.

1) In case of "Ding-Dong" alarming



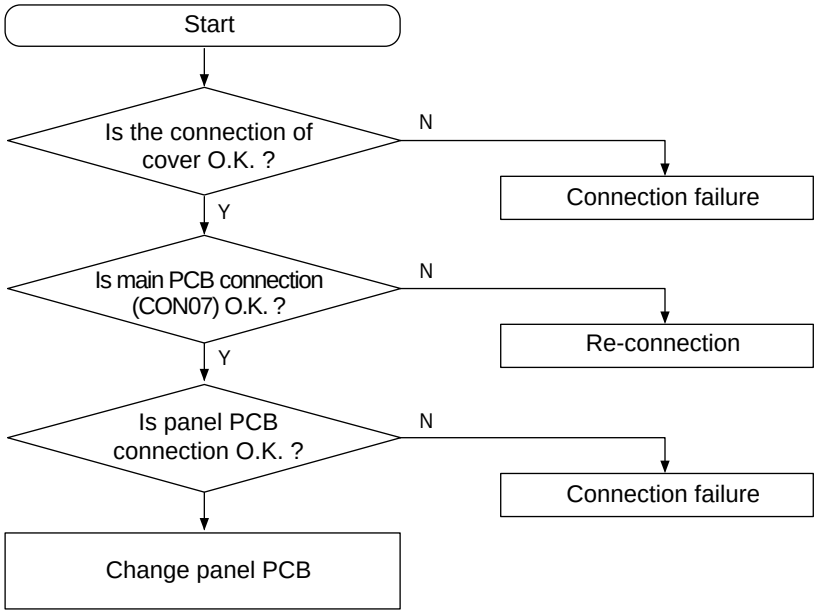
2) In case of "Beep-Beep" alarming



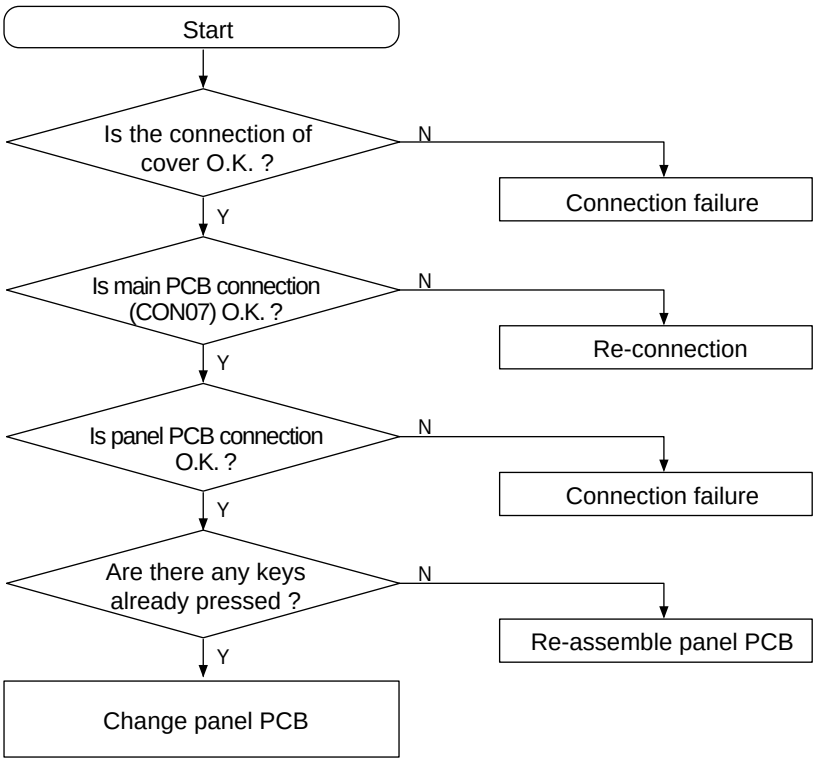
references

- There is no "beep-beep" alarming except the forced deforst or sensing trouble during self diagnosis.
- If self diagnosis sensed trouble, it is displayed on the panel PCB, so easy to check. If not , the forced deforst or forced operation is selected the notch status are "High"-"Mid.High" at that time.

3) In case of no panel PCB display



4) In case of the panel PCB key selection is impossible



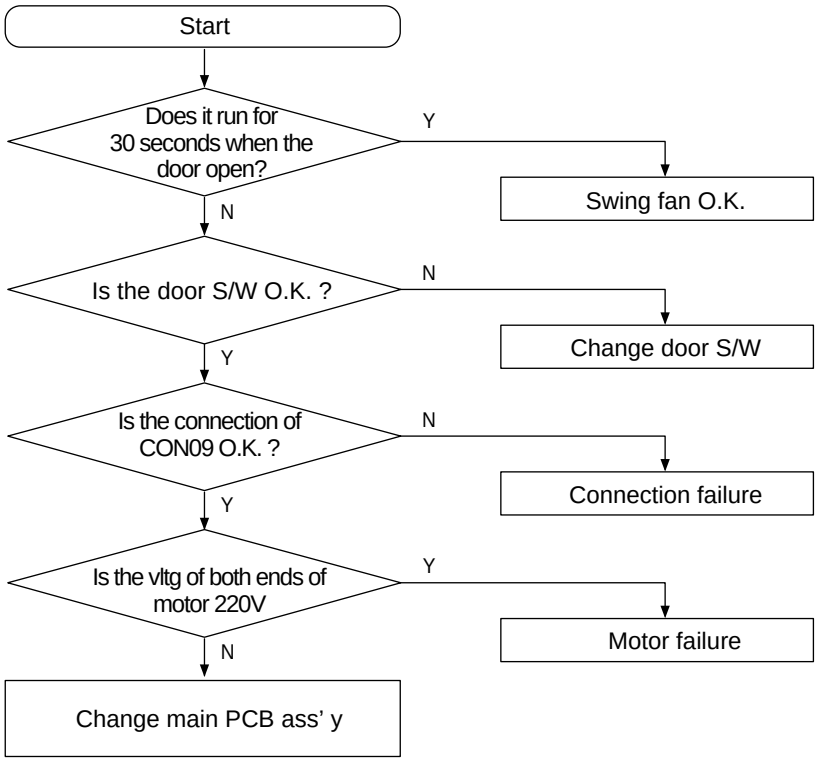
9-4 In case of fan do not run

references

'Be sure to check cooling fan under forced operation.'

1. F-fan, R-fan and Comp cooling fan are off when Comp is off.
2. Though the Comp is on, the R-fan is not always on because the fan is off when the temperature was reached to the set point.
3. There is delaying time to run the fan after door open (Comp on state) . The delay time varys from ten seconds to one minute. (Forced operation included)

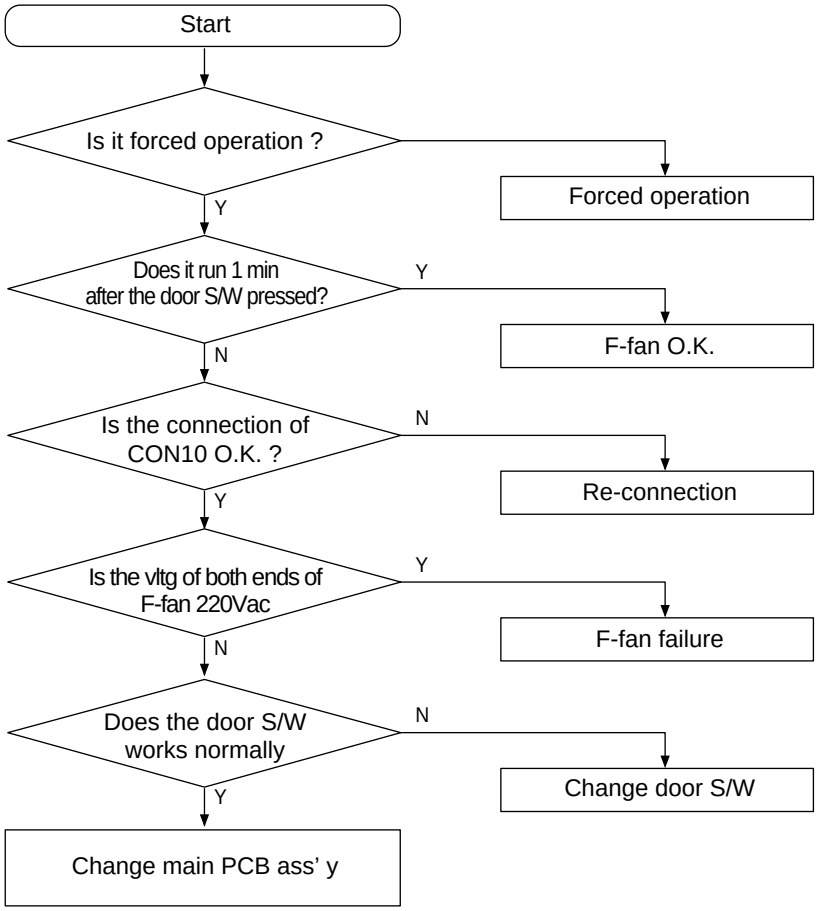
9-5 In case of swing fan in the refrigerator doesn' trun.



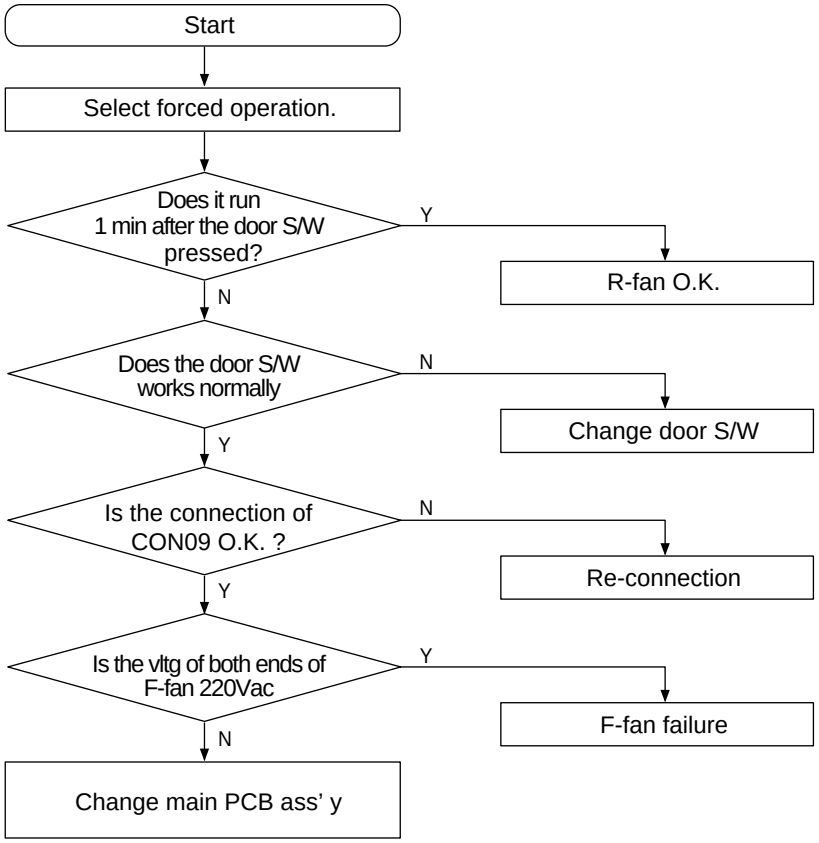
references

1. Swing fan doesn' t run at the off state of R-fan. (door closed)
2. Swing fan runs for 30 seconds when the door is open but from then it doesn' t work as the door opened continuously. It' s just runs for 30 seconds from the time the door is opened.

1) In case of F-fan doesn' t run

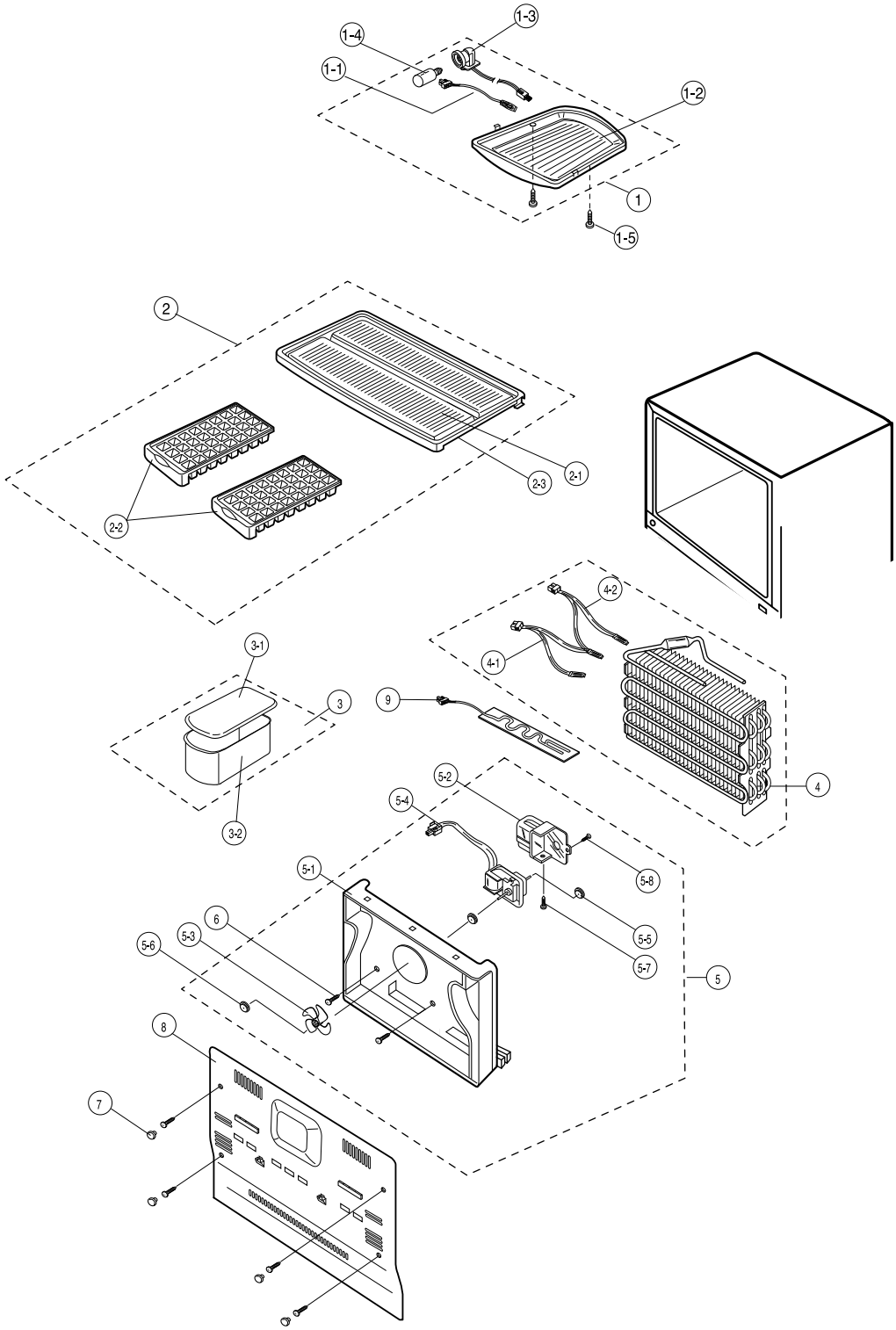


2) In case of R-fan doesn' trun



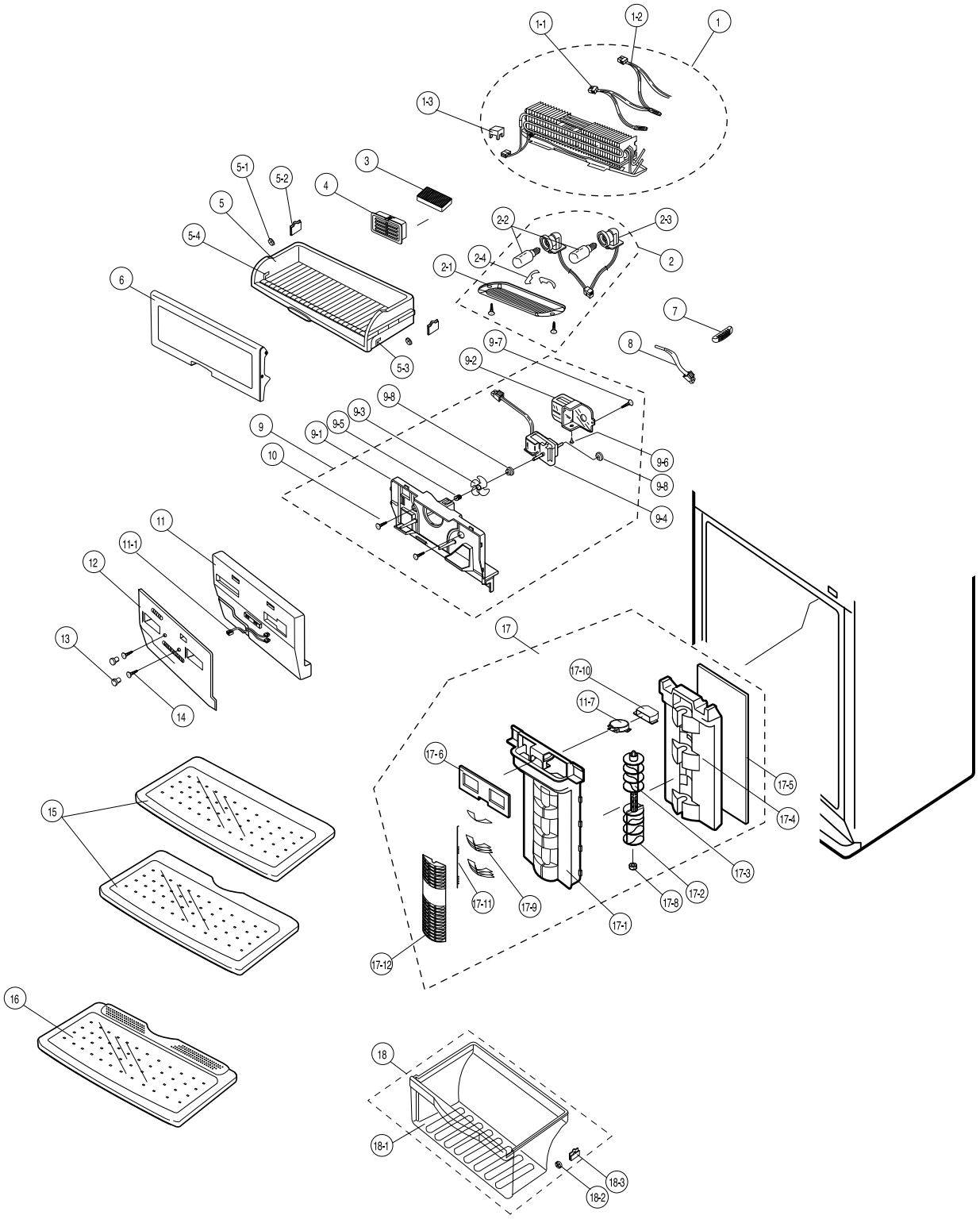
10. Disassemble & assemble drawing and part list

10-1 Freezing Compartment



NO	CODE-NO	ITEM	SPECIFICATIONS	Q'TY	REMARK
1	DA63-11041B	COVER LAMP FRE ASSY	220V, 240V	1	
	DA63-11041C	COVER LAMP FRE ASSY	110V, 127V	1	
1-1	DA32-10109A	SENSOR FRE	502AT	1	
1-2	DA63-11030A	COVER LAMP FRE	MIPS	1	
1-3	DA47-40112R	LAMP HOLDER	PBT	1	
1-4	4713-000213	LAMP-INCANDESCENT	220V~240V/15W	1	
	4713-001035	LAMP-INCANDESCENT	110V~127V/15W	1	
1-5	6002-000215	SCREW TAP TH	1-4X16FE, FXY	2	
2	DA67-20163N	SHELF FRE ASSY	GPPS	1	
2-1	DA67-20135D	SHELF FRE	GPPS	1	
2-2	DA67-40299A	TRAY ICE	PP	2	
2-3	DA64-20194A	TRIM SHELF	PE	4	
3	DA63-10403C	CASE ICE		1	
3-1	DA63-10338A	COVER CASE ICE	GPPS	1	
3-2	DA67-10205D	CASE ICE CUBE	HIPS	1	
4	DA59-40245B, C, A, D	EVAP-FRE ASSY	110V, 127V, 220V, 240V	1	
4-1	DA47-10148D	THERMO FUSE	250V, 10A	1	
4-2	DA32-10105G	SENSOR-REF	250V, 10.5A	1	
5	DA63-11044C, D, F, E	COVER-EVAP REAR(FRE)ASSY	110V, 127V, 220V, 240V	1	
5-1	DA63-11035A	COVER-EVAP REAR	PP	1	
5-2	DA63-10364A	COVER MOTOR FAN	PP	1	
5-3	DA31-20103A	FAN	ABS, 120μ	1	
5-4	DA31-10109D	MOTOR-FAN	110V, 2650RPM	1	
	DA31-10109W	MOTOR-FAN	127V, 2650RPM	1	
	DA31-10109B	MOTOR-FAN	220V, 2650RPM	1	
	DA31-10109F	MOTOR-FAN	240V, 2650RPM	1	
5-5	DA63-40119A	GROMMET FAN MOTOR	NBR	2	
5-6	DA61-20128A	SPRING FAN	SUS27WR	1	
5-7	DA72-60042A	BUMPON-MOTOR	NBR	1	
5-8	6002-000224	SCREW TAP TH	2S 4X16FE, FZY	1	
6	6002-000215	SCREW TAP TH	1-4X16FE, FZY	6	
7	DA67-30266D	CAP-SCREW	PP	4	
8	DA63-10402K	COVER-EVAP FR(FRE)ASSY	PP	1	
9	DA47-20208G	HEATER DRAIN	110V/13W	1	
	DA47-20208H	HEATER DRAIN	127V/13W	1	
	DA47-20208F	HEATER DRAIN	220V/13W	1	
	DA47-20208J	HEATER DRAIN	240V/13W	1	

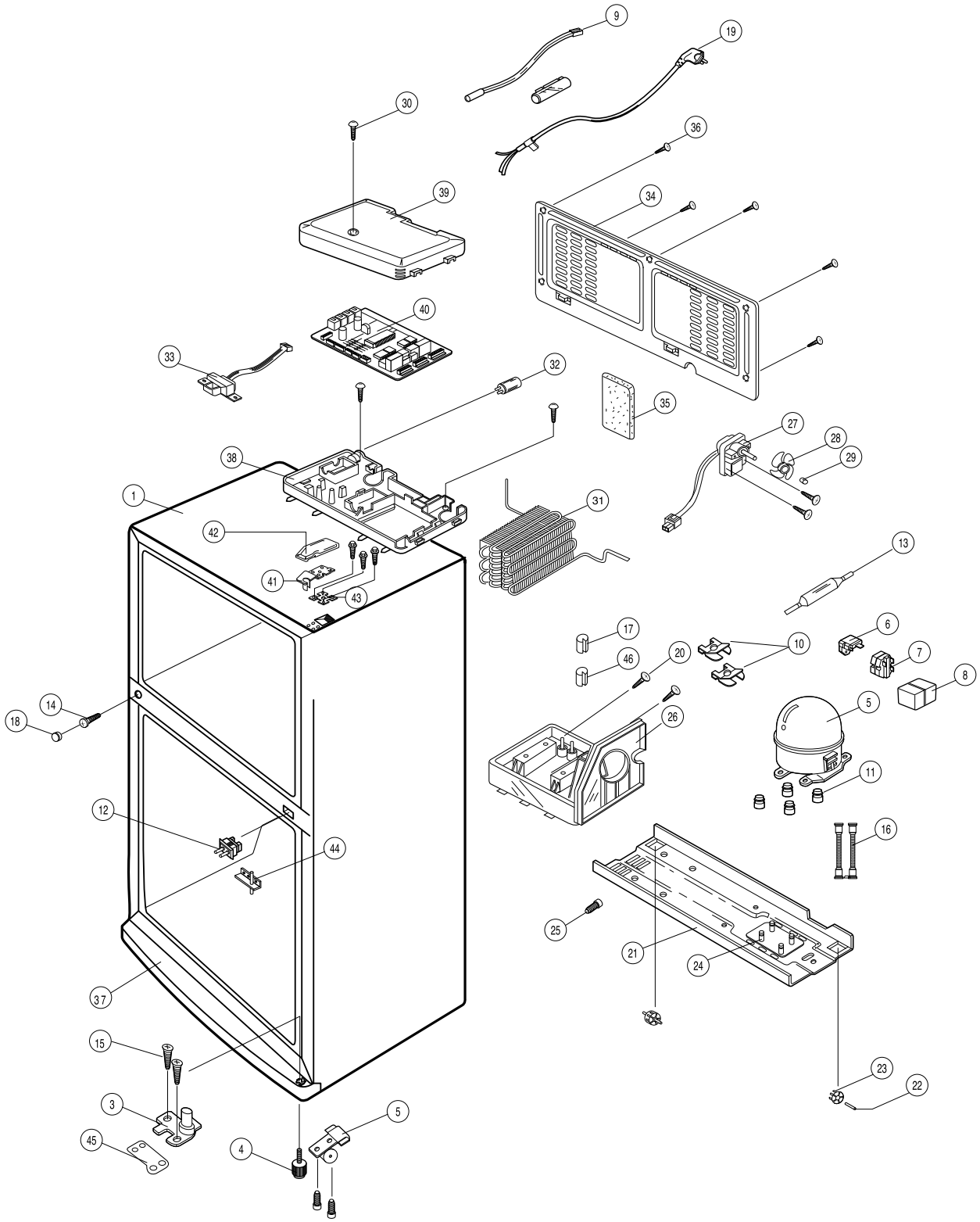
10-2 Refrizerating Compartment



NO	CODE-NO	ITEM	SPECIFICATIONS	Q'TY	REMARK
1	DA59-40238C, E, A, B	EVAP-REF ASSY	110V, 127V, 220V, 240V	1	
1-1	DA47-10148D	THERMO FUSE	250V, 10A	1	
1-2	DA32-10105G	SENSOR-DEF	250B, 10.5A	1	
1-3	DA63-40001A	GROMMET EVAP	NR	1	
2	DA63-11040D, C	COVER-LAMP REF ASSY	110~127V, 220~240V	1	
2-1	DA63-11031A	COVER LAMP REF	SAN	1	
2-2	4713-000213	LAMP-INCANDESCENT	220V~240V/15W	2	
	4713-001035	LAMP-INCANDESCENT	110V~127V/15W	2	
2-3	DA47-40112T	HOLDER LAMP	PBT	2	
2-4	DA61-70266A	SUPT LAMP	STS	2	
3	DA02-90106E	CATALYST-LTC	T15, W40, L70	1	
4	DA63-11036A	COVER-PURIFIER	PP	1	
5	DA67-40300D	TRAY-CHILL ROOM ASSY		1	
5-1	DA66-10104A	ROLLER-FREE	POM	2	
5-2	DA71-20145A	FIXER ROLLER	NY-66	2	
5-3	DA64-20205A	TRIM TRAY, R	PE	1	
5-4	DA64-20204A	TRIM TRAY, L	PE	1	
6	DA63-11020D	COVER-CHILLED ASSY		1	
7	DA63-10467A	COVER-SENSOR REF	HIPS	2	
8	DA32-10105B	SENSOR-ASSY	502AT	2	
9	DA63-10534L, R, J, K	COVER EVAP REAR REF ASSY	110V, 127V, 220V, 240V	1	
9-1	DA63-10216A	COVER EVAP RE, (R)	PP	1	
9-2	DA63-10364A	COVER MOTOR FAN	PP	1	
9-3	DA31-20103A	FAN	ABS	1	
9-4	DA31-0109D, W, B, F	FAN-MOTOR	110V, 127V, 220V, 240V	1	
9-5	DA61-20128A	SPRING FAN	SUS27WR	1	
9-6	DA72-60042A	BUMPON MOTOR	NBR	1	
9-7	6002-000224	SCREW TAP TH	2S 4X12FE, FZY	1	
9-8	DA63-40119A	GROMMET FAN MOTOR	NBR	2	
10	6002-000215	SCREW TAP TH	1-4X16FE, FZY	2	
11	DA72-40484A	INS, COVER EVAP FR		1	
11-1	DA39-20122E	WIRE HARNESS GEARED		1	
12	DA63-10235F	COVER EVAP FRONT(REF)		1	
13	DA67-30266D	CAP SCREW	PP,WHT	2	
14	6002-000215	SCREW-TAP TH	1-4X16FE, FZY	2	
15	DA67-20172B	SHELF-REF ASSY		2	
16	DA63-10384G	COVER-VEG ASSY		1	
17	DA63-10237J	COVER-DUCT ASSY	110V~127V	1	SR-606(8)EV
	DA63-10237E	COVER-DUCT ASSY	220V~240V	1	SR-606(8)EV
	DA63-10237L	COVER-DUCT ASSY	110V~127V	1	SR-646(8)EVSR-686(8)EV
	DA63-10237F	COVER-DUCT ASSY	220V~240V	1	SR-646(8)EVSR-686(8)EV
17-1	DA63-10897E	COVER-DUCT REF	HIPS	1	
17-2	DA31-20133B	BLADE AIR LOW	ABS	1	
17-3	DA31-20135B	BLADE AIR UPP	ABS	1	
17-4	DA72-30193A	SPACER DUCT, REF	FOAM-PS	1	
17-5	DA72-60158C	SEAL DUCT, REAR	FOAM-PE	1	

NO	CODE-NO	DESCRIPTION	SPECIFICATIONS	Q'TY	REMARK
17-6	DA72-60161D	SEAL DUCT, AIR	PVC-FOAM	1	
17-7	DA31-10107D	GEARD MOTOR	AC220V~240V	1	
	DA31-10107E	GEARD MOTOR	AC110V~127V	1	
17-8	DA60-40104A	WASHER	ID 04, T0.5	1	
17-9	DA31-20132A	BLADE-AIR GUIDE	PP	7	
17-10	DA63-40133A	GROMMET MOTOR	NBR	1	
17-11	DA31-20132A	BLADE CONNECTING		1	
17-12	DA63-11024A	COVER DUCT, FR	HIPS	1	
18	DA67-10227F	CASE-VEG ASSY		1	
18-1	DA67-10228A	CASE VEG	GPPS	1	
18-2	DA66-10104A	ROLLER-FRE	POM	4	
18-3	DA71-20145A	FIXER ROLLER	NY-66(PA)	4	

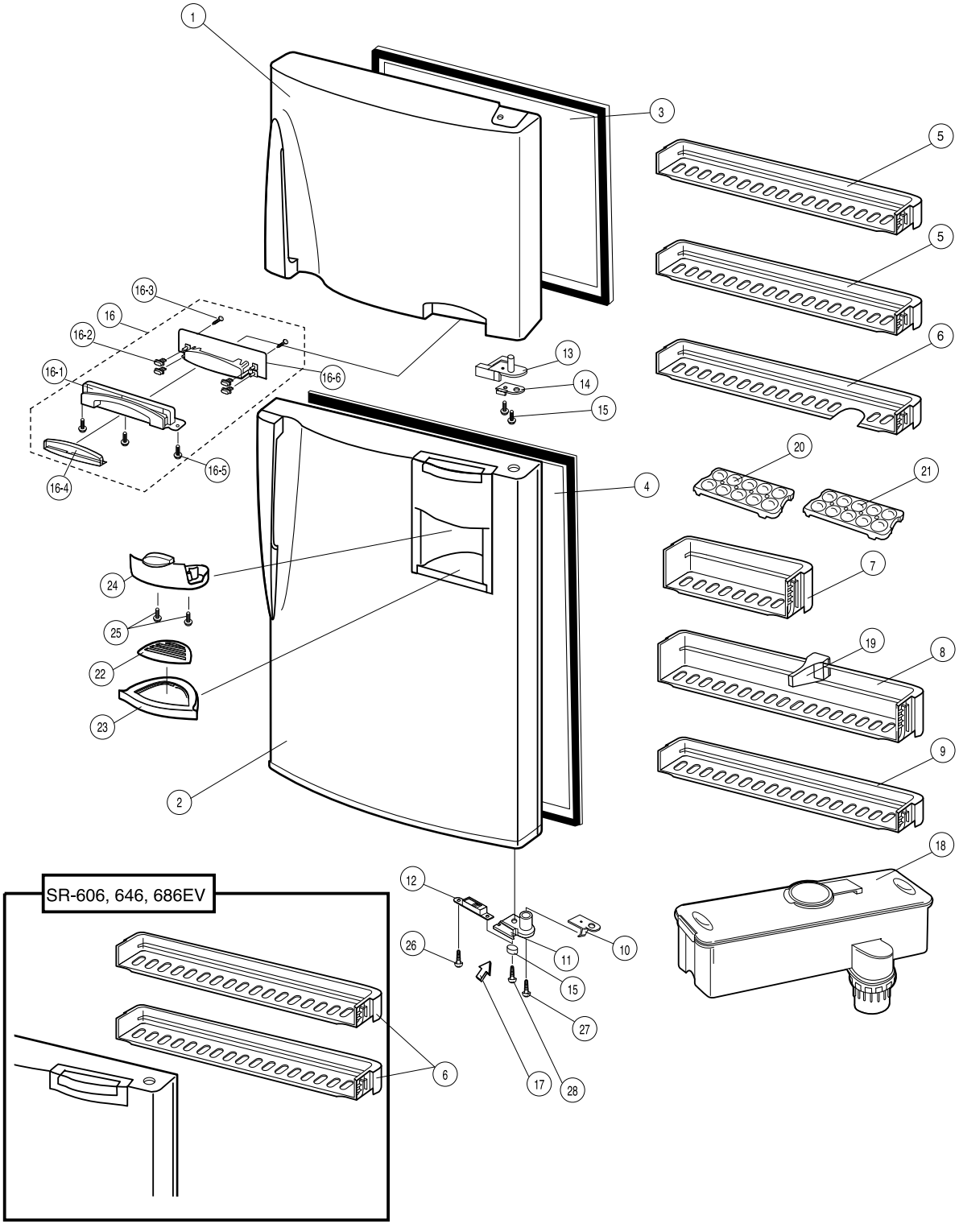
10-3 Cabinet and Unit Compartment



NO	CODE-NO	ITEM	SPECIFICATIONS	Q'TY	REMARK
1	DA90-10230P	ASSY-CABI FOAM		1	
2	DA61-40115B	CASTER-FRONT	PP	2	
3	DA61-10145D	HINGE-LOW	SCP1	1	
4	DA61-30127B	FOOT-ASSY	PP	2	
5	DA59-50021A	COMPRESSOR	SK182C-L2W	1	
	DA59-50033A	COMPRESSOR	SK182P-L2W	1	
	DA59-50014A	COMPRESSOR	SK190H-L2U		
	DA59-50015A	COMPRESSOR	SK190Q-L2U		
6	DA34-10003P	O/L PROTECTOR	4TM444NHBYY-53		
	DA34-10003P	O/L PROTECTOR	4TM444NHBYY-53		
	DA34-10003W	O/L PROTECTOR	4TM314RHBYY-53		
	DA34-10003G	O/L PROTECTOR	4TM232SHBYY-53		
7	DA35-10003H	PTC	PTHAS-T100M200B		
	DA35-10003H	PTC	PTHAS-T100M200B		
	DA35-10003L	PTC	PTHAR-T220M350D		
	DA35-10003N	PTC	PTHAS-T330M385D		
8	DA63-10352A	COVER-RELAY	PP	1	
9	DA32-10105F	SENSOR-ASSY(EXIT)		1	
10	DA65-20101A	CLAMP-COMP	STC5, TO.6	2	
11	DA63-40234C	GROMMET-COMP	NBR, BLK	4	
12	DA34-10122D	DOOR SWITCH	WHT	1	
13	DA73-30102A	DRYER	CU. OD18.85, L119	1	
14	DA60-10104B	SCREW TAP TITE	SNC3	1	
15	DA60-10110A	SCREW SPECIAL, C	M5, STS	3	
16	DA62-20001C	TUBE-PVC	PVC	2	
17	DA63-40171B	GROMMET-COMP	NBR	4	
18	DA67-30218P	CAP-SCREW	PP	1	
19	DA39-10123	POWER-CORD	L2500(OPTION)	1	
20	6002-000216	SCREW TAP TITE	PH1-4X20	2	
21	DA71-60123F	CHASSIS COMP ASSY		1	
22	DA60-90101A	RIVET CASTER	MSWR10, ZPC	2	
23	DA61-40101C	CASTER REAR	PP, NTR	2	
24	DA66-20112A	SHAFT COMP	SUM24,ZPC2(YEL)	2	
25	DA60-10107A	SCREW EARTH	BSBN, M4X10	1	
26	DA67-40176C	TRAY DRAIN WATER ASSY		1	
27	DA31-10110G	MOTOR-CIRCUIT	110V	1	
	DA31-10110L	MOTOR-CIRCUIT	127V	1	
	DA31-10110F	MOTOR-CIRCUIT	220V	1	
	DA31-10110H	MOTOR-CIRCUIT	240V	1	
28	DA31-20102A	FAN-SIRRCOO	ABS, P/120	1	
29	DA61-20128A	SPRING-FAN	STS27	1	
30	6002-000215	SCREW TAPPING	TH1-4X16	2	
31	DA73-10314C	PIPE SUB COND ASSY	TO.7, OD4.76, L969	1	
32	2501-001091	CAPACITOR	5μF, 350VAC	1	
	2401-000511	CAPACITOR	12μF, 250VAC	1	
	2501-000423	CAPACITOR	125μF, 125VAC	1	
33	DA26-30112A	TRANS-DC	105V/50,60HZ	1	
	DA26-30112B	TRANS-DC	127V	1	
	DA26-30110C	TRANS-DC	220V	1	
	DA26-30110A	TRANS-DC	240V	1	
34	DA63-10243A	COVER-COMP ASSY	SECC1	1	

NO	CODE-NO	ITEM	SPECIFICATIONS	Q'TY	REMAR
35	DA72-60019A	SEAL PAM ABSORB	T10, W170, L170	1	
36	6002-000213	SCREW TAPPING	TH 4X12FR, FZY	3	
37	DA63-11029A	COVER LEG, FRONT	PP	1	
38	DA67-10105G	CASE CONTROL BASE	PP-VO	1	
39	DA63-10212H	COVER-PCB PANEL	PP	1	
40	DA41-20146A	ASSY-MAIN PCB	SR-606(8)EV	1SET	
	DA41-20105F	ASSY-MAIN PCB	SR-606(8)EV	1SET	
	DA41-20146B	ASSY-MAIN PCB	SR-646(8), 680(8)EV	1SET	
	DA41-20105G	ASSY-MAIN PCB	SR-646(8), 686(8)EV	1SET	
41	DA61-10205A	HINGE-UPP	SHP1, T3.2	1	
42	DA63-10920G	COVER-HINGE UPP	PP	1	
43	DA63-50145A	SHIM-HINGE UPP	RD-PVC T1.0	1	
44	DA61-10146C	HINGE-MID ASSY	SHP1 T4.0	1	
45	DA63-50146A	SHIM-HINGE, LOW	RD-PVC T1.0	1	

10-4 Door Parts

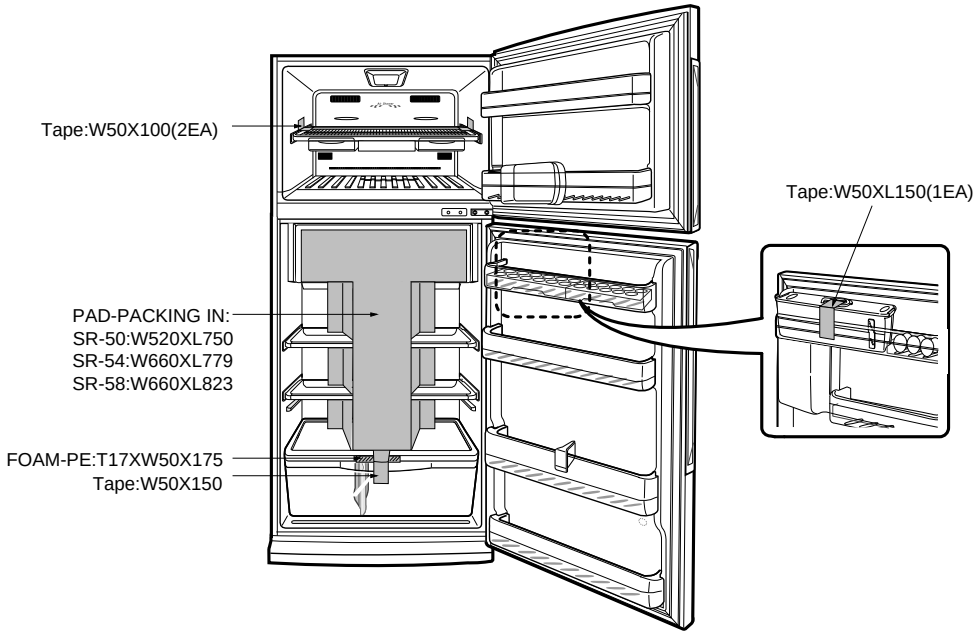


NO	CODE-NO	DESCRIPTION	SPECIFICATION	Q'TY	REMARK
1	(1)(2)(3)(4)	ASS'Y FOAM DOOR FRE	SR-606, 608V	1SET	(1)NOBLE-BEIG
	DA91-10258L, M, N, P	ASS'Y FOAM DOOR FRE			(2)MMD GRAY
		ASS'Y FOAM DOOR FRE			(3)MILKY WHITE
	(1)(2)(3)(4)	ASS'Y FOAM DOOR FRE			(4)LIGHT GREEN
	DA91-10258Q, R, S, T	ASS'Y FOAM DOOR FRE	SR-646, 648EV, SR-686, 688EV	1SET	
2	DA91-10259M, N, P, Q	ASS'Y FOAM DOOR FRE	SR-606EV	1SET	
	DA91-10260H, J, K, L	ASS'Y FOAM DOOR FRE(WITHDISPENSER)	SR-608EV	1SET	
	DA91-10259R, S, T, U	ASS'Y FOAM DOOR FRE	SR-646EV	1SET	
	DA91-10260M, N, P, Q	ASS'Y FOAM DOOR FRE(WITHDISPENSER)	SR-648EV	1SET	
	DA91-10259V, W, X, Y	ASS'Y FOAM DOOR FRE	SR-686EV	1SET	
	DA91-10259R, S, T, U	ASS'Y FOAM DOOR FRE(WITHDISPENSER)	SR-688EV	1SET	
3	DA63-30178N	GASKET DOOR FRE ASS'Y	SR-606, 608EV	1	
4	DA63-30178P	GASKET DOOR FRE ASS'Y	SR-606, 608EV	1	
5	DA63-20160B	GUARD FRE	GPPS	2	
6	DA63-20158A	GUARD VARIETY ,A	GPPS SR-608, 648, 688EV	1	
7	DA63-20159B	GUARD VARIETY ,B	GPPS SR-608, 648, 688EV	1	
8	DA63-20162C	GUARD BOTTLE	GPPS	1	
9	DA63-20161C	GUARD REF LOW	GPPS	1	
10	DA71-40135A	STOPPER MID	STS304	1	
11	DA63-40118A	GROMMET HINGE MID	POM	1	
12	DA65-90111H	ASS'Y AUTO CLOSE	SR-60, 64, 68	1	
13	DA71-40169A	STOPPER DOOR MID	SR-60, 64, 68	1	
14	DA63-10894B	STOPPER DOOR,C	SR-60, 64, 68	1	
15	-	SCREW TAP PH	M4X14 FE FZY	2	
16	DA63-10984B	CASE-PCB ASS'Y	EXP ALL	1SET	
16-1	DA67-10401C	CASE-PCB	EXP ALL	1	
16-2	DA64-40135C(L)	KNOB TOUTH	ABS MP-0160	2	
	DA64-40135C(R)	KNOB TOUTH	ABS MP-0160	2	
16-3	6002-000466	SCREW TAP PH	2S 3X8 FE, FZY	2	
16-4	DA63-10894A	COVER PCB PANEL	GPPS	1	
16-5	6002-000453	SCREW TAP FH	FH1 4X12 STS304	3	
16-6	DA41-20156B	PCB PANEL ASS'Y	EXP ALL	1SET	
17	DA71-10272B	REINF HINGE.REF	SHP1 T3.0	1	
18	DA74-90136B	TANK-WATER ASS'Y	WITH DISPENSER	1SET	
19	DA71-10272A	GUIDE BOTTLE	PP	1	
20	DA67-40297A	TRAY EGG,A	GPPS	1	
21	DA67-40298A	TRAY EGG,B	GPPS	1	
22	DA67-40294B	TRAY DISPENSER,B	ABS	1	
23	DA67-40295A	TRAY DISPENSER,A	ABS	1	
24	DA63-10905E	COVER DISPENSER ASS'Y	WITH DISPENSER	1SET	
25	6002-000213	SCREW TAP	TH1 4X12 FE FZY	1	
26	6002-000213	SCREW TAP TH	1-4X12 FE, FZY	1	
27	-	SCREW-PH	MAX25, FE, FZY	1	
28	6002-000215	SCREW TAP TH	1-4X14 FE, FZY	2	

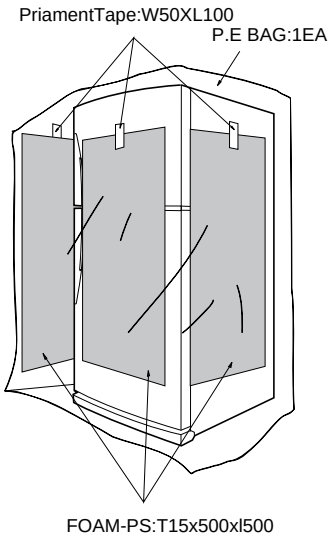
Indicated part is for eclectrical safety components

12. Packaging method

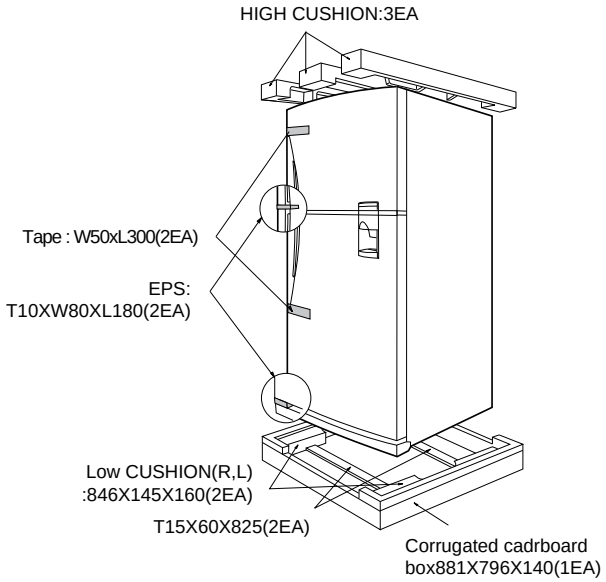
♦ Packaging specifications of door and inside of cab

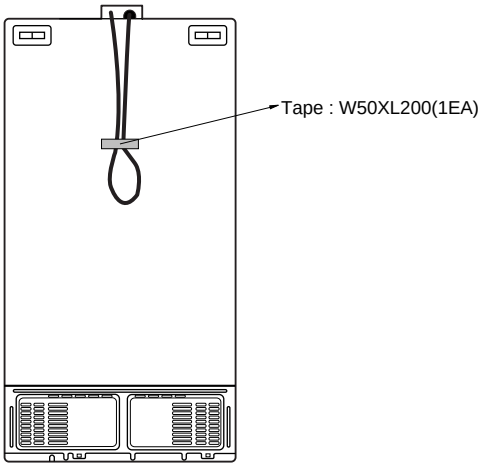


♦ Completed packaging specification



♦ Packaging specifications of rear and front



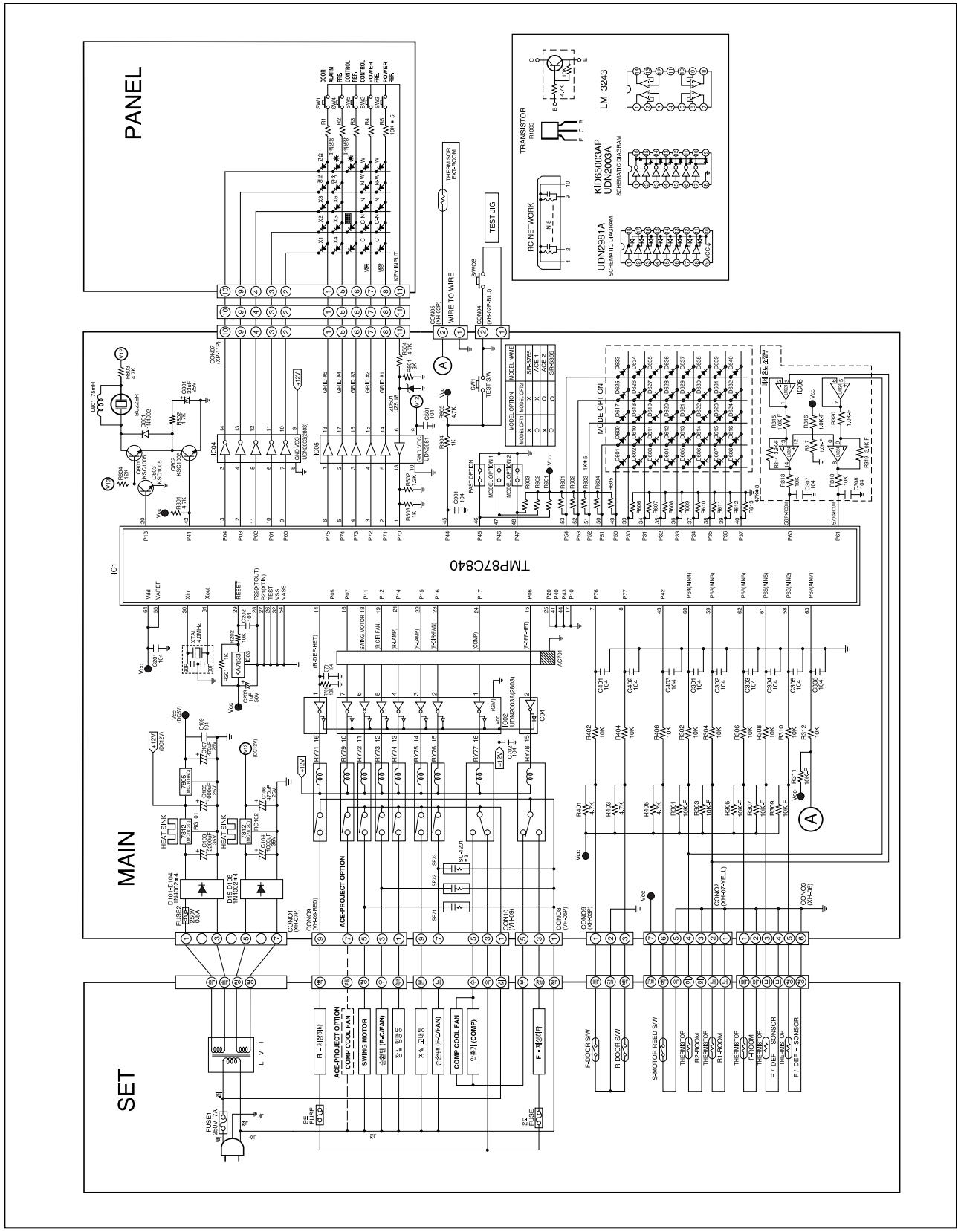


14. PCB Specification

14-1 Parts for service

NO	PART	SPEC.	SPEC.	VENOR	Q'TY	REMARK
1	DA26-30110B	TRANS-DC	105V/50,60HZ	YOUKYUNG	1	
	DA26-30112A	TRANS-DC	105V/50,60HZ	SEG1		
	DA26-30112B	TRANS-DC	127V/50,60HZ			
	DA26-30110C	TRANS-DC	220V/50,60HZ			
	DA26-30110A	TRANS-DC	240V/50HZ			
2	DA32-10105B	R, R2, F-SENSOR COMMON USE	502 AT	DONGKWANG	3	
3	DA32-10105G	R, F DEF-SENSOR	502 AT	DONGKWANG	2	
4	DA32-10105F	EXT-SENSOR	502 AT	DONGKWANG	1	
5	DA41-20149A	PCB PANEL	SR-60, 64, 68	SEOUL SEMI-CONDUCTOR	1	DISP NO
6	DA41-20105F	PCB MAIN	SR-60, 64, 68	KWANGJU ELECTRONICS	1	TOSHBA MICOM

13 PCB Diagram circuit



13-2 Part list

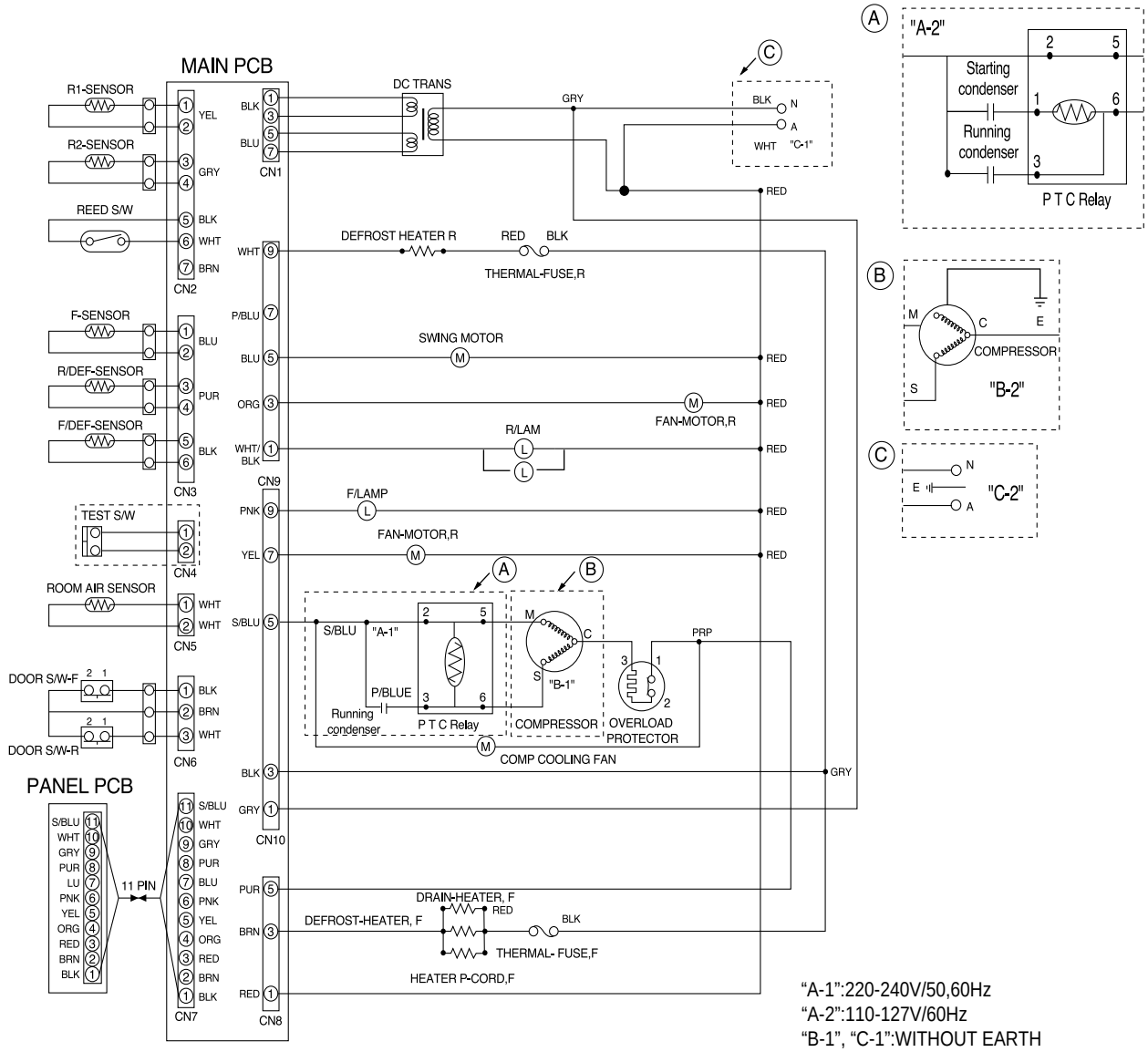
NO	PART	SPEC.	CODE-NO	Q'TY	UNIT	VENOR	PART NO.	REMARK
1	IC-MCU(OTP)	TMP87PH40AN	4B4002-0595	1	EA	TOSHIBA	IC01	NEW(PGM)
2	RESONATOR	CST4.00MGWTF01	4B1283-0053	1	EA	MURATA	X-TAL	ACE COMMON USE
3	RELAY	VSB-12TB	4B3068-0004	2	EA	TAKAMISWA	RY77, RY78	ACE COMMON USE
4	RELAY	JZ1 aFS-12V	4B3068-0072	6	EA	MATSUSHITA	RY71-RY76	ACE COMMON USE
5	IC-DRIVER	ULN2981A	42109-101-021	1	EA	ALLEGRO	IC05	NEW
6	IC-DRIVER	UDN2003A	42219-701-008	2	EA	ALLEGRO	IC02, IC04	NEW
7	PCB-MAIN	135*197 FR-1	46029-0034	1	EA	CHUNGJU ELECTRONICS	PCB	NEW
8	VOLTAGE-REG	MC7812CT	4A4008-0178	2	EA	SAMSUNG SEMMI-CONDUCTOR	RG101,RG102	ACE COMMON USE
9	VOLTAGE-REG	KIA7805PI	41129-602-022	1	EA	SAMSUNG SEMMI-CONDUCTOR	RG103	ACE COMMON USE
10	HEAT-SINK "S1"	AL L30	41124-0043-00	2	EA	SHINDANG INDUSTRY	RG101,RG102	ACE COMMON USE
11	FUSE-CLIP	FH-51H	4A3064-0021	1	EA	YUNHO ELECTRONICS	FUSE2	ACE COMMON USE
12	FUSE	500mA/250V	4A3065-0156	1	EA	SAMJU ELECTRONICS	FUSE2	ACE COMMON USE
13	IC-RESET	KA7533	4A4008-0754	1	EA	SAMSUNG SEMMI-CONDUCTOR	IC03	NEW
14	RC-NETWORK	RCN-10	4A1114-0006	1	EA	DOOSHIN ACCURACY	AC701	ACE COMMON USE
15	RC-NETWORK	SQ1201	4A1114-0007	3	EA	KEUMKANG ELECTRONICS	SP71-73	ACE COMMON USE
16	BUZZER	CBE2220BA	4A1305-0012	1	EA	BUJUN ELECTRONICS PARTS	BZ	ACE COMMON USE
17	TACT-SW	SKHV 10910A	4A3018-0047	1	EA	KYUNGIN ELECTRONICS	TEST-SW	ACE COMMON USE
18	ZERNER-DIODE	UZ 5.1B, 5.1V	4A4106-0048	1	EA	PYUNGCHANG TRADE	ZD501	ACE COMMON USE
19	JUMP-WIRE	TA0.6PI/52mm	40509-400-108	19	EA	WON CONSTRUCTION	J01-J20	ACE COMMON USE
20	TRANSISTOR	KSR1005	4A4068-0008	3	EA	SAMSUNG SEMMI-CONDUCTOR	Q801,Q802,Q803	ACE COMMON USE
21	OP-AMP IC	LM324	4A4008-0774	1	EA	SAMSUNG SEMMI-CONDUCTOR	IC06	NEW
22	COIL	75mH/10%	4A1130-0085	1	EA	BUJUN INDUSTRY	L801	ACE COMMON USE
23	SCREW	PH-2S 3*8	47008-130-081	2	EA	TAIYANG METAL	FUSE	ACE COMMON USE
24	DIODE-REC	1N4004	4A4104-0109	9	EA	PYUNGCHANG TRADE	D101-108,601	ACE COMMON USE
25	C-ELEC	2200uF 35V	4A1104-0087	1	EA	SAMHWA ELECTRIC	C103	NEW
26	C-ELEC	1000uF 35V	4A1104-0641	2	EA	SAMHWA ELECTRIC	C104,105	ACE COMMON USE
27	C-ELEC	1uF 50V	4A1104-0500	1	EA	SAMHWA ELECTRIC	C203	ACE COMMON USE
28	C-ELEC	470uF 25V	4A1104-0057	2	EA	SAMHWA ELECTRIC	C106,C107	ACE COMMON USE
29	C-ELEC	33uF 25V	4A1104-0025	1	EA	SAMHWA ELECTRIC	C801	ACE COMMON USE
30	C-CERAMIC	104Z	4A1100-0340	18	EA	DANGYANG HEREDITY		ACE COMMON USE
31	R-METAL	3.9K-F 1/4W	4A1000-0409	2	EA	ABCO, HANRYUK	R314	NEW
32	R-METAL	1.0K-F 1/4W	41018-275-102	4	EA	ABCO, HANRYUK	R315,316,317,320	NEW
33	R-METAL	10K-F 1/4W	41018-275-103	6	EA	ABCO, HANRYUK	R301,303,305,	ACE COMMON USE
							R307,309,311	ACE COMMON USE
34	R-CARBON	1K-J 1/4W	4A1000-0151	8	EA	ABCO, HANRYUK	R201,503,601,602,R603	ACE COMMON USE
							,604,605,904	ACE COMMON USE
35	R-CARBON	1.2K-J 1/4W	4A1000-0005	1	EA	ABCO, HANRYUK	R502	NEW
36	R-CARBON	4.7K-J 1/4W	4A1000-0174	7	EA	ABCO, HANRYUK	R401,403,405,504,R801	ACE COMMON USE
							,803,905	

NO	PART	SPEC.	CODE-NO	Q'TY	UNIT	VENOR	PART NO.	REMARK
37	R-CARBON	10K-J 1/4W	41018-227-103	16	EA	ABCO, HANRYUK	R202,302,304,306, R308,310,312,313, R318,402,404,406, R701,901,902,903	ACE COMMON USE
38	R-CARBON	12K-J 1/4W	41018-227-123	1	EA	ABCO, HANRYUK	R804	ACE COMMON USE
39	R-CARBON	47K-J 1/4W	41018-277-473	8	EA	ABCO, HANRYUK	R606-613	ACE COMMON USE
40	R-CARBON	4.7-J 1/4W	4A1000-0261	1	EA	ABCO, HANRYUK	R804	ACE COMMON USE
41	CONNECTOR	YW396-09AV(WHT)	4A6010-0530	1	EA	YUNHO ELECTRONICS	CON10	ACE COMMON USE
42	CONNECTOR	YW396-09AV(RED)	4A6010-0546	1	EA	YUNHO ELECTRONICS	CON09	ACE COMMON USE
43	CONNECTOR	YW396-05AV(WHT)	4A6010-0470	1	EA	YUNHO ELECTRONICS	CON08	ACE COMMON USE
44	CONNECTOR	SMW250-07(WHT)	4A6010-1407	1	EA	YUNHO ELECTRONICS	CON01	ACE COMMON USE
45	CONNECTOR	SMW250-03(WHT)	4A6010-1387	1	EA	YUNHO ELECTRONICS	CON06	ACE COMMON USE
46	CONNECTOR	SMW250-07(YEL)	4A6010-1409	1	EA	YUNHO ELECTRONICS	CON02	ACE COMMON USE
47	CONNECTOR	SMW250-06(WHT)	4A6010-1402	1	EA	YUNHO ELECTRONICS	CON03	ACE COMMON USE
48	CONNECTOR	SMW250-11(WHT)	4A6010-1427	1	EA	YUNHO ELECTRONICS	CON07	ACE COMMON USE
49	CONNECTOR	SMW250-02(WHT)	4A6010-1382	1	EA	YUNHO ELECTRONICS	CON05	ACE COMMON USE
50	CONNECTOR	SMW250-02(BLU)	4A6010-1385	1	EA	YUNHO ELECTRONICS	CON04	ACE COMMON USE
51	IC-MCU(MSK)	TMP87PH40AN-XXXX	4B4002-0825	1	EA	TOSHIBA	IC01	NEWPGM)

4. Electric Diagram

1. 110~115V/60Hz, 127V/60Hz, 220V/50Hz, 240V/50Hz

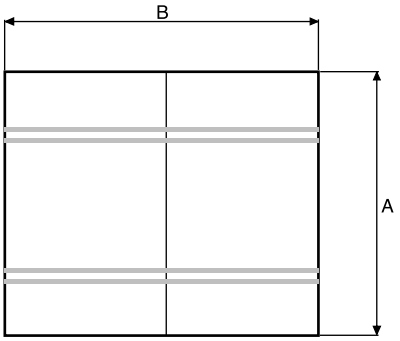
CIRCUIT-DIAGTAM

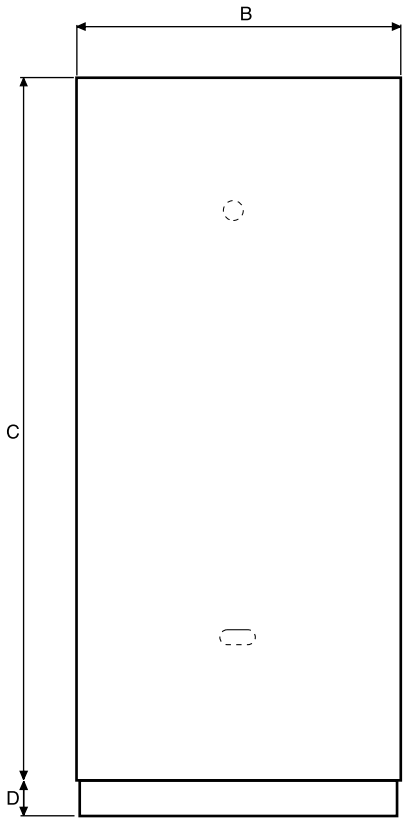


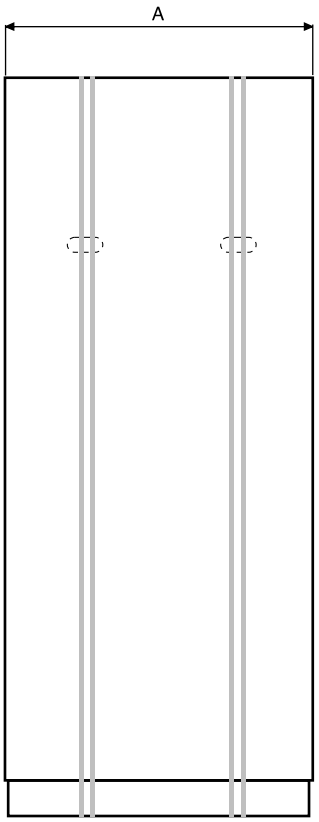
"A-1":220-240V/50,60Hz
"A-2":110-127V/60Hz
"B-1", "C-1":WITHOUT EARTH
"B-2", "C-2":WITH EARTH

RED-RED	WHT-WHITE
BLUE-BLUE	YEL-YELLOW
ORG-ORANGE	BLK-BLACK
	P/BLUE-PINK/BLUE
BRN-BROWN	PRP-PURPLE
PINK-PINK	W/BLK-WHITE/BLACK
GRY-GRAY	S/BLU-SKY BLUE

5. Out Package Specification





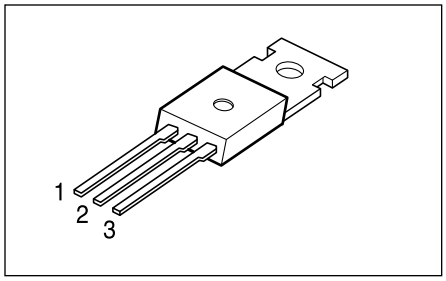


Model	A	B	C	D	Remark
SR-606EV	814	899	1806	50	–
SR-608EV	814	899	1806	50	Dispenser applied
SR-646EV	899	1858	50	-	
SR-648EV	814	899	1858	50	Dispenser applied
SR-686EV	814	899	1902	50	–
SR-688EV	814	899	1902	50	Dispenser applied

15. Main components specifications

1) REGULATOR

3-TERMINAL 1A POSITIVE VOLTAGE GRGULATORS



The MC78XX/MC78XXA series of three-terminal positive regulators are available in the TO-220 package and with several fixed output voltaes, making it useful in a wide range of applicationes. These regulaators can provide local oncard regulation, eliminating the distribution problems assciated with single point regulation. Each type employs internal current limiting, thermal shut-down and safe area protection, making it essentially indestructible. If adequate heat sinking is provided, they can delive over aA output corrent. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents. MC78XXI is characterized for operation from -40° °Cto +125°c, and MC78XXC from 0°c to +125°c
TO-220 1 2 3 1 : Input 2 : GND 3 : Output

FEATURES

- **UOutput Current up to 1.5A**
- **UOutput voltages of 5;6;8;9;10;11;12;15;18;24V**
- **UThermal Overload Protection**
- **UShort Circuit Protection**
- **UOutput Transistor SOA Protection**
- **UNo external components required**
- **UOutput current in excess of 1A**
- **UIndustrial and commercial temperature range**

ORDERING INFORMATION

Device	Package	Operating Temperature
MC78XXCT	TO-220	0~+125°C
MC78XXACT	TO-220	
MC78XXT	TO-220	-40~+125°C

BLOCK DIAGRAM

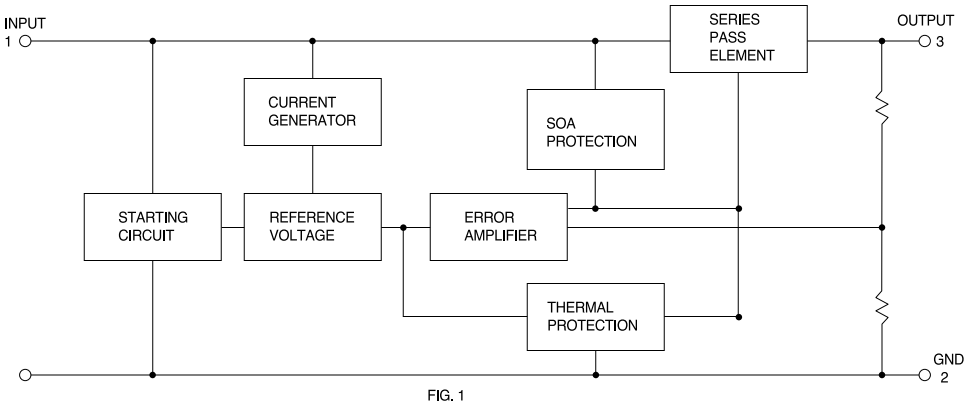


FIG. 1

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Rating	Unit
Input Voltage (for V_O = 5V to 18V)	V_{IN}	35	V
(for V_O = 24V)	V_{IN}	40	V
Thermal Resistance Junction - Cases	θ_{JC}	5	°C/W
Thermal Resistance Junction - Air	θ♣JA	65	θ/W
Operating Temperature Range MC78XXC/AC	T_{opr}	0 ~ +125	°C
MC78XXI		-40 ~ +125	°C
Storage Temperature Range	Tstg	-65 ~ +150	°C

2) REGULATOR(MC7812C)

ELECTRICAL CHARACTERISTICS MC7812

(Refer to test circuit, $T_{min} < T_i < T_{max}$, V_i = 500mA, V_i = 19V, C_i = 0.33μF, C_o = 1.0μFunless otherwise specified)

Characteristic	Symbol	Test Conditions	MC7805C			Unit
			Min	Typ	Max	
Output Voltage	V_o	Ti = 25°C	11.5	12	12.5	V
		5.0mA≤I_o≤1.0A, P≤15W V_{in} = 14.5V to 27V V_i = 15.5V to 27V	11.4	12	12.6	
Line Regulation	ΔV_o	Ti = 25°C, V_i = 14.5V to 30V		10	240	mV
		Ti = 25°C, V_i = 16V to 22V		3.0	120	
Load Regulation	ΔV_o	Ti = 25°C, I_o = 5.0mA to 1.5V		12	240	mV
		Ti = 25°C, I_o = 250mA to 750mA		4.0	120	
Quiescent Current	I_d	T_i = 25°C		5.1	8	mA
Quiescent Current Change	ΔI_d	Io = 5mA to 1.0A			0.5	mA
		V_i = 14.5V to 30V			1.0	
		V_i = 15V to 30V				
Output Voltage Drift	$\Delta V_o/\Delta T$	I_o = 5mA		-1		mV/°C
Output Noise Boltage	V_n	f = 10Hz to 100KHz T_i = 25°C		75		μ / V
Ripple Rejection	RR	fF = 120Hz V_i = 15 to 25V	55	71		dB
Dropout Voltage	V_D	I_o = 1A, T_i = 25°C		2		V
Output Resistance	R_O	f = 1KHz		18		mΩ
Short Circuit Current	I_{SC}	V_i = 35V, T_i = 25°C		250		mA
Peak Current	I_{peak}	T_i = 25°C		2.2		A

* $T_{min} < T_i < T_{max}$
  MC78XXI : T_{min} = -40°C, T_{max} = 125C
  MC78XXC, T_{min} = 0°C, T_{max} = 125°C
* Load and line regulation are specified at constant junction temperature. Changes in V_o due to heating effects must be taken into account separately. Pulse testint with low duty is used.

MC 7805 AC(T)

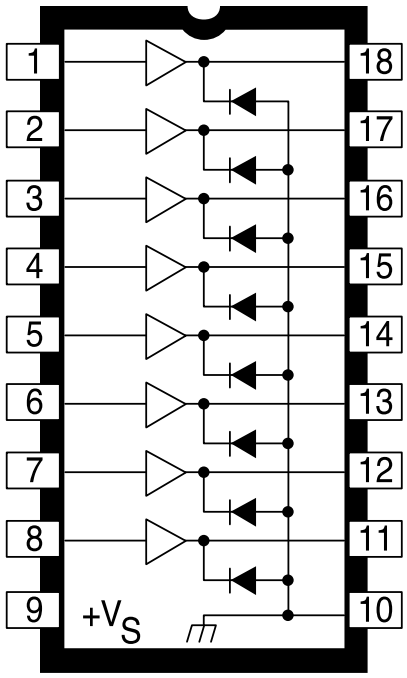
ELECTRICAL CHARACTERISTICS MC7805

(Refer to test circuit, $T_{min} < T_i < T_{max}$, I_o = 500mA, V_i = 10V, C_i = 0.33ßfi, unless otherwise specified)

Characteristic	Symbol	Test Conditions	MC7805C			Unit
			Min	Typ	Max	
Output Voltage	V_o	Ti = 25°C	4.8	5.0	5.2	V
		5.0mA ≤ I_o ≤ 1.0A, P_o ≤ 15W V_i = 7V to 20V V_i = 8V to 20V	4.75	5.0	5.25	
Line Regulation	ΔV_o	Ti = 25°C, V_i = 7V to 25V		5.0	100	mV
		Ti = 25°C, V_i = 8V to 12V		1.5	50	
Load Regulation	ΔV_o	Ti = 25°C, I_o = 5.0mA to 1.5V		9	100	mV
		Ti = 25°C, I_o = 250mA to 750mA		3	50	
Quiescent Current	I_d	T_i = 25°C		5.0	8	mA
Quiescent Current Change	ΔI_d	Io = 5mA to 1.0A			0.5	mA
		V_i = 7V to 25V			1.3	
		V_i = 8V to 25V				
Output Voltage Drift	$\Delta V_o/\Delta T$	I_o = 5mA		-0.8		mV/℃
Output Noise Boltage	V_n	f = 10Hz to 100KHz T_i = 25°C		40		µ/V
Ripple Rejection	RR	F = 120Hz V_i = 8 to 18V	62	78		dB
Dropout Voltage	V_D	I_o = 1A, T_i = 25°C		2		V
Output Resistance	R_O	f = 1KHz		17		mΩ
Short Circuit Current	I_{SC}	V_i = 35V, T_i = 25°C		250		mA
Peak Current	I_{peak}	T_i = 25°C		2.2		A

* $T_{min} < T_i < T_{max}$
  MC78XXI : T_{min} = -40°C, T_{max} = 125°C
  MC78XXC, T_{min} = 0°C, T_{max} = 125°C
* Load and line regulation are specified at constant junction temperature. Changes in V_o due to heating effects must be taken into account separately. Pulse testint with low duty is used.

HIGH-VOLTAGE, HIGH-CURRENT SOURCE DRIVERS



Dwg No A 10243

ABSOLUTE MAXIMUM RATINGS at +25°c Free-Air Temperature

Cutput Voltage Range, V_{CE}
(UDS298t and UDS2982H/R).....**5V to 50V**
(UDS2983 and UDS2984H/R).....**35V to 80V**
Input Voltage, V_{in}
(UDS2981 and UDS2983H/R).....**15V**
(UDS2982 and UDS2984H/R).....**30V**
Output Current, I_{out}-.....**500 mA**
Ground Terminal Current,
I_{GND}.....**3.0A**
Power Dissipation. P_D
(any one driver).....**1.1W**
(total package).....**See Graph**
Operating Temperature Range,
T_A.....**-55°C to + 125°C**
Storage Temperature Range,
T_S.....**-65°C to + 150°C**

Series UDS2980H and UDS2980R hermetically sealed source drivers link standard low-power digital logic and relays, solenoids, magnetic print hammers, stepping motors, LEDs, and lamps in applications requiring separate logic and load grounds, load supply voltages to +80V, and load currents to 500 mA.

Types UDS2981H/R and UDS2983H/R are intended for use with 5v logic systems(TTL, Schottky TTL. DTL and 5V CMOS). UDS2982H/R and UDS2984H/R integrated circuits are intended for MOS interface (PMOS and CMOS) operating from supply voltages of from 6 to 16V.

Types UDS2981H/R and UDS2982H/R will withstand an output OFF voltage of 50 V. UDS2983H/R and UDS2984H/R drivers will withstand a maximum output OFF voltage of 80V.

Under normal operating conditions, the devices will sustain 50 mA continuously on each of the eight outputs at an ambient temperature of +85°c and with a supply voltage of 15V. All types include input current-limiting resistors and output transient-suppression diodes. In all cases, outputs are swiched ON by an active high input level.

Note that the maximum current rating may not be obtained at -55°c because of reduced beta, or at +125°c because of package power limitations.

Series UDS2980H drivers are furnished in 18-pin ceramic/metal(side-brazed) hermetic dual in-line packages. Series UDS2980R drivers are supplied in ceramic/glass(cer-DIP) hermetic packages. Both are processed to the requirements of MIL-STD-883. Class B.

The same circuits are also available in 18-pin plastic dual in-line packages (Series UDN2980A) for operation over a limited temperature range, or where higher package power dissipation is needes.

FEATURES

- TTL, DTL, PMOS, or CMOS Compatible Inputs
- 500 mA Output Source Current Capability
- Transient-Protected Outputs
- High-Reliability Screening to MIL-STD-883, Class B
- Operating Temperature -55°c to+125°c

Always order by complete part number, e.g.,
See table on next page for differences between devices.

UDS2981H883

ELECTRICAL CHARACTERISTICS from -55°c to +125°c (unless otherwise specified).

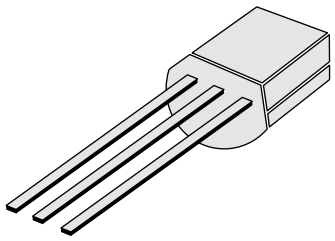
Chracteristic	Symbol	Applicable Devices	Temp.	Test Conditions	Fig.	Limit
Maximum Output Leakage Current	I_{CEX}	UDS2981/82		V_{IN} = 0.25 V, V_S = 50 V	1	200 µA
		UDS2981/84		V_{IN} = 0.25V, V_S = 80 V	1	200 µA
Maximum Collector-Emitter Saturain Voltage	$V_{CE(SAT)}$	UDS2981/83	-55˚C	V_{IN} = 2.4 V, I_{OUT} = -100 mA	2	2.0 V
				V_{IN} = 2.4 V, I_{OUT} = -200 mA	2	2.1 V
			+25˚C	V_{IN} = 2.4 V, I_{OUT} = -350 mA	2	2.0 V
			+125˚C	V_{IN} = 2.4 V, I_{OUT} = -100 mA	2	1.8 V
				V_{IN} = 2.4 V, I_{OUT} = -200 mA	2	1.9 V
		UDS2982/84	-55˚C	V_{IN} = 5.0 V, I_{OUT} = -100 mA	2	2.0 V
				V_{IN} = 5.0 V, I_{OUT} = -200 mA	2	2.1 V
			+25˚C	V_{IN} = 5.0 V, I_{OUT} = -350 mA	2	2.0 V
			+125˚C	V_{IN} = 5.0 V, I_{OUT} = -100 mA	2	1.8 V
				V_{IN} = 5.0 V, I_{OUT} = -200 mA	2	1.9 V
Maximum Input Current	$I_{IN(ON)}$	ALL		V_{IN} = 2.4 V	3	295 µA
				V_{IN} = 3.85 V	3	600 µA
				V_{IN} = 12 V	3	2.3 mA
	$I_{IN(OFF)}$	UDS2981/82		V_{IN} = 0 V, V_S = 50 V	3	10 µA
		UDS2983/84		V_{IN} = 0 V, V_S = 80 V	3	10 µA
Maximum Output Source Current	I_{OUT}	UDS2981/83		V_{IN} = 2.4 V, V_{CE} = 2.2 V	2	-200 mA
		UDS2982/84		V_{IN} = 5.0 V, V_{CE} = 2.2 V	2	-200 mA
Maximum Supply Current (Outputs Open)	I_S	UDS2981	+25˚C	V_{IN} = 2.4 V, V_S = 50 V	4	10 mA
		UDS2982		V_{IN} = 5.0 V, V_S = 50 V	4	10 mA
		UDS2983		V_{IN} = 2.4 V, V_S = 80 V	4	10 mA
		UDS2984		V_{IN} = 5.0 V, V_S = 80 V	4	10 mA
Maximum Turn-ON Delay Time	t_{PHL}	UDS2981/82	+25˚C	V_S = 35 V, R_L = 175 Ω	7	2.0 µs
		UDS2983/84		V_S = 50 V, R_L = 250 Ω	7	2.0 µs
Maximum Turn-OFF Delay Time	t_{PHL}	UDS2981/82	+25˚C	V_S = 35 V, R_L = 175 Ω	7	10 µs
		UDS2983/84		V_S = 50 V, R_L = 250 Ω	7	10 µs
Maximum Clamp Diode Leakage Current	I_R	UDS2981/82		V_{IN} = 0.25 V, V_S = 50 V	5	50 µA
		UDS2983/84		V_{IN} = 0.25 V, V_S = 80 V	5	50 µA
Maximum Clamp Diode Forward Voltage	V_F	ALL		I_F = 200 mA	6	1.75 V

*All inputs simultaneously.
**Pused test.
*Complete part number includes a terminal letter that indicates package (H = ceramic/metal side-brazed. R = ceramic/glass cer-DIP).

SWITCHING APPLICATION (Bias Resistor Built In)

- Switching Circuit, Inverter, Interface circuit Driver circuit.
- Built in bias Resistor (R,=4.7KΩ, R=10KΩ)
- Complement to KSR2005

TO-92

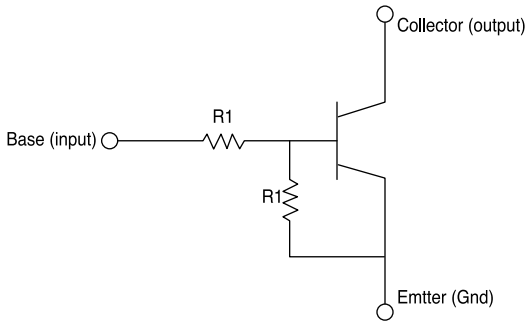


1 Emitter 2 Collector 3 Base

ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	50	V
Collector-Emitter Voltage	V_{CBO}	50	V
Emitter-Base Voltage	V_{CBO}	10	V
Collector Current	I_C	100	mA
Collector Dissipation	P_C	300	mW
Junction Temperature	T_I	150	°C
Storage Temperature	T_{stg}	-55-150	°C

ELECTRICAL CHARACTERISTICS (T_a=25°C)

Characteristic	Symbol	Test Condition	Main	Typ	Max	Unit
Collector-Base Breakdown Voltage	BV_{CBO}	I_C=10μA, I_B=0	50			V
Collector-Emitter Breakdown Voltage	BV_{CBO}	I_C=100μA, I_B=0	50			V
Collector Cutoff Current	I_{CBO}	V_{CB}=40V, I_B=0			0.1	μA
DC Current Gain	H_C	V_{CB}=5V, I_B=5mA	30			
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=10mA, I_B=0.5mA			0.3	V
Output Capacitance	C_{ob}	V_{CB}=10V, I_B=0 t=1MHz		3.7		pF
Current Gain-Bandwidth Product	F_r	V_{CB}=10V, I_C=5mA		250		MHz
Input Off Voltage	$V_{I(off)}$	V_{CB}=5V, I_C=100μA	0.3			V
Input On Voltage	$V_{I(off)}$	V_{CB}=0.3V, I_C=20mA			2.5	V
Input Resistor	R_1		3.2	4.7	6.2	KΩ
Resistor Ratio	R_1/R_2		0.42	0.47	0.52	

Equivalent Circuit